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**PRESENCE IN THE LITTORALS  
THE CORVETTE SOLUTION?**

by

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**June 1994**

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Presence in the Littorals  
The Corvette Solution?

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Submitted in partial fulfillment of the  
requirements for the degree of

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from the

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## ABSTRACT

Forward deployed naval forces are expected to remain the principal military option for underscoring U.S. foreign policy objectives abroad. But as the numbers of deployable ships decline, keeping adequate numbers of U.S. Navy forces deployed will become increasingly difficult. Since no nation possesses unlimited resources, determining the correct number, capability, and mix of warships is extremely difficult, if not impossible. As large numbers of expensive combatants become difficult to budget, they become, in a sense perhaps, "irreplaceable," a liability which can outweigh their unparalleled capabilities. Small, 1,500 ton corvettes offer a supplement by way of their ability to apply "appropriate naval force at the decisive point, at the decisive moment."

Although small combatants are not part of present American naval strategy, this thesis concludes that such corvettes can contribute efficiently to several of the roles and forward presence missions of the future. This conclusion is based on three interrelated factors: national strategy, fiscal constraints, and emerging or anticipated technologies. A flotilla of small combatants would be a complementary supplement to the combatant fleet of 2010, sustaining our tactical advantage and strategic commitment as a world leader. The penalty of building only large and expensive warships could be inadequate numbers for success in war availability in peace.

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## EXECUTIVE SUMMARY

Forward deployed naval forces are expected to remain the principal military option for underscoring U.S. foreign policy objectives abroad. This expectation is based not only on the continuing drawdown of "fixed" American forces abroad, but also in recognition of the unique and attractive nature of naval forces, including: flexibility, responsiveness, durability, and recallability. But as the numbers of deployable ships decline keeping the forward deployment of adequate numbers of U.S. Navy forces will become increasingly difficult. So-called "adaptive force packages" are an attempt to solve part of the problem, yet some theater coverage is increasingly being "gapped."

Since no nation possess unlimited resources, determining the correct number, capability, and mix of warships is extremely difficult, if not impossible. Part of the dilemma centers around the question of quality vs. quantity, most notably how to build, maintain, and operate extremely capable and expensive ships, adequate in number to persevere during conflict, while also having enough ships to accomplish a myriad of peacetime commitments.

As large numbers of expensive combatants become less affordable and, in a sense perhaps, "irreplaceable," their liabilities can outweigh their unparalleled capabilities. The high cost of procurement can influence the nation's willingness to take risks, and thereby present the operational commanders with a dilemma: how to fight for sea control while preserving at all costs, the "irreplaceable handful of capital

ships. Small, 1,500 ton corvettes can offer a solution by way of their ability to apply "appropriate naval force at the decisive point, at the decisive moment."

Although small combatants are not part of present American naval strategy, this thesis concludes that small corvettes, operating together as a flotilla, can reliably perform several of the roles and forward presence missions of the future. This conclusion is based on three interrelated factors: national strategy, fiscal constraints, and emerging or anticipated technologies.

Recognizing that the military potential and character of the force obviously influences and, at times, dictates mission success, the thesis demonstrates how a flotilla, postulated to consist of eight 1,500 ton corvettes and a mothership, can contribute to or reinforce American commitment abroad. This contribution balances several goals which seem important to the Nation as a whole, to sustain American military tactical advantage and strategic commitment as a world leader. Technological innovation makes this possible as it has overcome much of the straight-line relationship between size, capability, and cost. By incorporating offship sensor nets (SEW and UAVs), sophisticated tactical data systems (TDS), and enhanced weapon suites, the future corvette can overcome many of the shortcomings presently associated with small ships. By contrast, the penalty of building only capital warships of DDG size and larger could be too few for success in war or availability in peace.

Port calls and multi-national exercises are indicators of goodwill, friendship, and cooperation, but when national resolve or capability are perceived to be weak,

then forward deployed forces may encounter challenges. In this light, the flotilla is viewed as a fighting force that signals an appreciation of the needs and realities of the future, and demonstrates that the United States desires to remain globally engaged. The corvette is intended to steam in front, leading the fight in littoral waters. The dispersion of the flotilla spreads the risk to the corvette force, a factor which could prove invaluable in a scenario where the probability of loss to mines, surprise ASCM attack, or submarine torpedoes is high. The flotilla can be a force multiplier, augmenting the CINCs concentration of forces in both time and space.

## I. INTRODUCTION

What we are trying to do is to find ways in which our nation may match our responsibilities as a nation...The job before all of us today is to learn the ins and outs of power and policy, so that our nation's intentions and the capacities to achieve these intentions may be brought into balance.<sup>1</sup>

After decades of "containment" and global vigilance, the Cold War's cessation portends new hopes and visions for the United States. Unlike after Versailles, Yalta, or Potsdam, no reparations, no occupations, and no massive efforts are required to rebuild entire nations. The Nation is able to redirect efforts and energies towards new challenges and opportunities, and if necessary, shift priorities.

This thesis concentrates on one aspect of national power, the utilization of naval force in underscoring foreign policy. Specifically the thesis proposes that the Navy can use relatively small surface combatants, "corvettes," to help carry out "forward presence" roles and missions.

The strategy for examining this proposition is modelled around projected United States' national interests in 2010. The time frame is chosen primarily because it provides the long lead time that is normally required to turn the warship designer's "gleam in the eye" into an operational weapon system. Ideally, if the strategy is correct, it should influence ship design and acquisition, but unfortunately, the process is more complex: technology can influence strategy, as can tactics. Similarly, agreed tactics can shape technical choices.

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<sup>1</sup>Gaddis, J. L., Strategies of Containment, p. 126, Oxford University Press, 1982. A quote during the Cold War by Dean Acheson to National War College students.

The Bottom Up Review (BUR) has called for a reassessment of the new era, the development of a new naval strategy, and a general re-structuring of U.S. armed forces.<sup>2</sup> This re-structuring of the forces, tactics, and training, to meet the threats of the future, is difficult considering the uncertainty of "the threat," decreasing defense budgets, diverse operational requirements, and complicated national priorities. The planner must shed conventional wisdoms and biases, which in this case includes re-examining the question if smaller, less detectable, and less expensive ships, can be used in lieu of "high end" warships, to effectively conduct presence.

In the end, the strategic interests are juxtaposed with the capabilities of the corvette in an effort to determine if, where, and when corvette flotillas may be applicable. The goal is to find a balance between requirements, capability and affordability. Figure 1 highlights the framework from which the suitability and potential contribution of corvettes is to be assessed.

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<sup>2</sup>U.S. Department of Defense, Aspin, L., Secretary of Defense, The Bottom-Up Review: Forces For a New Era, p. 1, September 1, 1993.

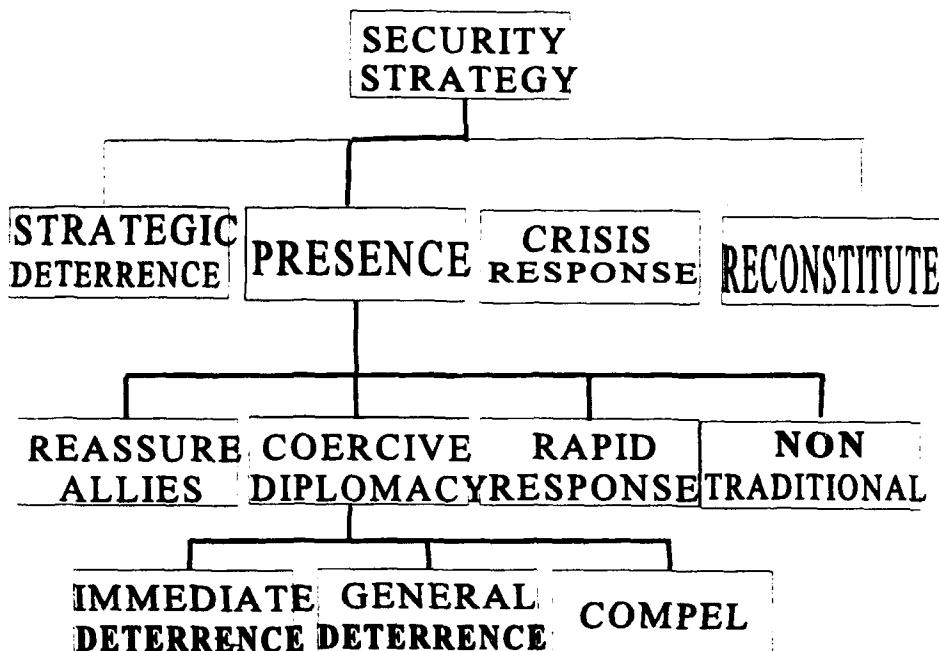


Figure 1: The corvette's strategic context

The first question that emerges when considering a corvette-size ship, is how can it contribute or reinforce American commitment abroad; when the military potential and the character of the force obviously influences and, at times, dictates mission success?

First, technological innovation has overcome the old adage that low cost or light displacement equate to low striking power. Corvettes offer an adaptive package, expressly tailored to perform on the littorals. Not only do the ships represent American commitment to certain regions, but they can increase the range of available options. Their relatively low cost (\$200 million) can provide the Nation with the necessary flexibility in numbers, visibility, capability, and response to prevail in the twenty-first century.

Second, corvettes exploit the influential intent behind presence. It must be remembered that presence, to be effective, requires "keeping and exploiting the initiative, by allowing the force conducting them much more latitude to decide the time, place, and nature of the combat, vice simply responding to attacks."<sup>3</sup> This requires ships designed for a myriad of missions and with an increasing emphasis on the word "cost effectiveness." Fiscal concerns are expected to intensify, and corvettes offer a solution without sacrificing the strategic intent or unacceptable tactical advantage.

Third, renewed emphasis on "green water" warfare significantly alters the calculus of presence, and the projection of power ashore may need to take place in a very demanding environment. Planners must not lose sight of this, as the essence of a warship remains its capability to seize, control, and deny. This can not be taken for granted in littoral waters, where naval forces may find themselves heavily contested, perhaps even outgunned initially.

Change is often resisted, for instance the British Admiralty reluctantly made the transition from sail to steam, wood to iron or steel, coal to oil, and paddles for propellers, with great reluctance.<sup>4</sup> To have done otherwise would have rendered the Royal Navy obsolete.

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<sup>3</sup>Till, Geoffrey, Modern Sea Power, vol. 1, p.63, Royal Naval College, Brassey's Defence Publishers, London, 1987. Describing a view held by former Chief of Naval Operations (CNO) Admiral Hayward, concerning the forward operations.

<sup>4</sup>Griffen, Admiral Sir Anthony, The Future of British Sea Power, "Weapons and Platforms," p.223, edited Geoffrey Till, Naval Institute Press, 1984.

## A. MISSION FORWARD PRESENCE

Forward presence has been a fundamental element of the national military strategy since the end of World War II, but only recently, since the end of the Cold War, has it been formally identified as a critical strategic mission.<sup>5</sup> The concept means different things to different people, but has generally referred to the stationing or rotational deployment of troops, aircraft, or naval forces abroad, in the furtherance of a nation's foreign policy. Occasional port visits are also manifestations of presence. The basic modern motivations behind the idea are similar to Pax-Romana or Pax-Britannica, when military forces were deployed beyond national borders to symbolize and reinforce their interest(s) in a particular region.

Forward presence is one means by which the United States demonstrates its national interests and its obligations as a world leader. Presence is dynamic, and can shift between several variations, depending on the circumstances. Today, presence appears to be shifting from the "fixed" deployment of ground and air forces, to a greater reliance on forces of a "variable" nature. At times, this presence, with its implied threat of military violence, is latent; at other times, it is active.

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<sup>5</sup>President of the United States, The White House, National Security Strategy of the United States, Washington, DC, January 1993. Four post-Cold War missions were identified: Besides "presence," the other three include: "Strategic deterrence" referring to the maintenance of a balanced deterrent force with both strategic and tactical offensive strategic capabilities, "crisis response" referring to a capability to respond to two simultaneous crises in widely separated regions, and "reconstitution" which refers to the ability to rebuild both the military and defense industries. The Bottom up Review, p.7, also cites presence as a "joint mission " area.

To be effective, presence entails two essentials. The first requires prioritizing among national goals, for each region poses peculiar threats, challenges, and volatilities. The second obviously requires that the military capability be adequate to the political tasking. As Table 1 depicts, this in itself is no easy task in light of the broad range of maritime missions which presence may be called to support.

TABLE 1: TYPICAL MARITIME MISSIONS

1.	Diplomatic reassurances (port visits)
2.	Multi-national maritime cooperation (exercises)
3.	Non-traditional (freedom of navigation, environmental, piracy, mass migration by sea, peacekeeping (PK), humanitarian)
4.	Surveillance
5.	Escort
6.	Visit, board, search, inspect (VBSI)
7.	Rescue personnel abroad (NEO)
8.	Maritime embargo / quarantine
9.	Safeguard seaborne trade and replenishment
10.	Battle space management (BSM)

**B. UNITED STATES NAVY CONSIDERATIONS**

Until the War of 1812, American trade in the Mediterranean Sea was precipitous at best, as mariners faced not only the normal hazards of operating on the high seas, but also the continual harassment to ship and crew from the pirates along the Barbary coast of North Africa. After three American administrations, President Madison recognized that various degrees of appeasement and coercion had failed, and decided that enough was enough. The Nation leased a port on the island of

Majorca, and dispatched a small American flotilla with orders to protect American interests in the region.<sup>6</sup> The plundering eventually came to a halt.

Since those days there have been frequent occasions for deploying American naval forces to various localities abroad. Tomorrow's naval forces are expected to remain the principal military option for underscoring U.S. foreign policy objectives abroad.<sup>7</sup> This assumption is based on the continuing drawdown of American ground forces abroad,<sup>8</sup> and in recognition of the unique and attractive nature of naval forces, including: flexibility, responsiveness, durability, and recallability.

To provide an idea of the scope of the presence which naval forces contribute today, consider a recent one-day snapshot:

December 1, 1993 --- 426 ship navy

194 Ships underway (45%)	12 Exercises in 10 countries
83 Ships deployed (20%)	Port visits to 12 countries <sup>9</sup>

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<sup>6</sup>LaFeber, W., The American Age, United States Foreign Policy at Home and Abroad Since 1750, p.52, Norton and Co., 1989.

<sup>7</sup>Blechman and Kaplan, Force Without War, p.55-56, Brookings Institute, Washington, 1978. The authors looked at 215 incidents in which the United States utilized armed force (including demonstrations) for political objectives between January 1, 1946 to December 31, 1975. During this time, naval units participated in over 2/3 of the incidents.

<sup>8</sup>Boatman, J., "Frontline Bases Form Bulk of U.S. Base Closures," Jane's Defence Weekly, p.11, 10 July 1993. For example over 840 sites have been returned to host governments since 1990.

<sup>9</sup>OPNAV, N51, POM briefing to the Secretary of the Navy, February 19, 1994. Add the following 1993 aggregates: port visits to 85 nations and 168 naval exercises conducted with 53 different countries.

What these data fail to directly portray is the contribution these naval units made in support of national interests: alliances were strengthened, regions stabilized, and American world leadership demonstrated.

Given fiscal realities, over 70 of the 426 warships that made up the U.S. Navy in December 1993 have been or are scheduled to be decommissioned in 1994. If 1993's approximate level of commitments persist in 1994, 54% of the fleet will have been underway on average, and nearly a quarter of the fleet (over 23%) deployed.

As the numbers of deployable ships decline, keeping ships forward deployed on station will become increasingly difficult. Considering that operating cycles and transit times are fairly static, time away from home port (OPTEMPO), deployments per cycle, and/or deployment lengths will have to increase, to maintain present commitments. If history is any indication, increasing the OPTEMPO will likely incur serious problems with personnel, morale, and retention.<sup>10</sup>

To meet present requirements with fewer resources, the Navy has scaled down the number of escorts in the carrier battle groups (CVBG) to an average of two cruisers (CG) and one destroyer, and does not routinely escort replenishment ships (except those deployed with the CVBG) or amphibious readiness groups (ARG). Should these high value ships require escorts in the future, not to mention the Afloat

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<sup>10</sup>George, J. L. (editor), The U.S. Navy, The view from the Mid-1980's, p.2, published with the Center for Naval Analyses, Westview Special Studies, 1985. For example, during the drawdown in 1979-1980, the navy experienced its worst retention and recruiting, manning the fleet up to only 91%, and by 1981, "13% of our ships and 25% of our aircraft squadrons were reporting themselves not combat ready as a result of personnel shortages."

Pre-Positioned Ships (APF) and various maritime lift components, it becomes apparent that the idea of a "residual" fleet, one of sufficient back-up surge capability, does not leave much room for contingencies. This does not even consider the occasional "uncharted pinnacle" or an unforeseen engineering casualty.

Beyond the mere reduction of the ARG / CVBG escorts, various cost savings measures were needed in 1993 to help finance the missions in Somalia and in the Adriatic. Several of these measures, if not positively changed, risk eventually impacting upon fleet readiness. Examples include the delay of numerous ship and aircraft overhauls, and the curtailing of 1993 4th quarter Pacific fleet operations and exercises.

So-called "adaptive force packages" are being considered as a way of solving the problem.<sup>11</sup> Whereas in the past, the Navy relied mostly on CVBGs or ARGs for forward presence, it now resorts increasingly to non-carrier combinations of ships. Some area theater coverage is also increasingly being "gapped."

### **C. SHIP MIX MISMATCH?**

Despite all of this creative re-packaging, the policy of building only the best warships may simply mean building too few for success in war or availability in peace. One consequence of this is that the number of ships available to escort and protect high value ships, which is arguably a requisite for successful prosecution of the campaign ashore, is noticeably lacking.

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<sup>11</sup>Bergeson, S.A., Adaptive Joint Force Packaging (AJFP) a Critical Analysis, Masters Thesis, Naval Postgraduate School, Monterey, CA, December 1993.

It appears that by 2010, the cruiser-destroyer inventory of "presence" combatants will be comprised exclusively of CG-47, DDG-51, and possibly DD-963 class ships. These vessels, the oldest of which will be over thirty years, will continue, in all likelihood, to be the most capable warships for protecting high value units, as well as the escort of shipping. These ships will also be part of the package sent in to "clean up" the battlespace, when the need arises to sanitize the area of responsibility (AOR).

As one considers the domestic and international economic climate, makeup and motivation of international navies, and the Navy's increasing focus on the littoral regions of the world, it seems that expensive and prestigious ships may be inappropriate for at least some forms of forward presence. Smaller, yet quite capable, ships can provide a complementary and increasingly necessary contribution to presence operations.

These factors affect the conduct of forward operations. The CINCs must ensure not only the availability of escorts to protect the CVBGs, ARGs, and the large vulnerable sealift, but they also require ample forces that can close within range to affect operations ashore. This requires warships that can sweep the path clear of threatening mines, submarines, and / or surface combatants, for operations close to the shore. Conceivably, these last "few miles" will be the toughest part of future naval warfare.

Whether "showing the flag" or protecting high value ships, forward presence requires adequate numbers of ships able to perform when, where, and how the

circumstances dictate. All of this suggests that the Nation either reassesses and downscals its commitments to the means available, or it risks the negative tactical and strategic consequences of overextension.

Corvette flotillas should be considered as a complementary means to meet the roles and missions entailed by forward presence.

## II. CORVETTE DESCRIPTION AND EMPLOYMENT

A country can, or will, pay only so much for its war fleet. That amount of money means so much aggregate tonnage. How shall that tonnage be allotted? And especially, how shall the total tonnage invested in armored ships be divided? Will you have a very few big ships, or more numerous medium ships?<sup>12</sup>

How can a 280-foot corvette with a notional displacement of 1,500 tons help solve a future United States forward presence "gap?" In order to provide the reader with an appreciation of how and what missions corvettes may be expected to accomplish, this section highlights the capabilities and limitations of these platforms. By applying new and emerging sensing, data control, and weapon technologies, corvette flotillas can offer an effective solution for many of the challenges anticipated in the first part of the twenty-first century.

### A. MISSIONS AND CAPABILITIES

Operating forward on a long tether places tremendous stress on both the ship and the crew. Based on interests and goals to be espoused in Chapter IV, the following general corvette capabilities are envisioned to conduct or support forward presence missions or tasks:

#### FIXED, ALWAYS AVAILABLE

Anti-air (AAW) Point defense only

Anti-surface (ASUW) Short range gun / missiles

Anti-submarine (ASW) Shallow water, short range prosecute and attack

#### OPTIONAL

Strike (STW)	Deep strike against shore or surface naval
Mines	Minelaying

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<sup>12</sup>Mahan, A.T., The Lessons of the War With Spain, p.37, Little Brown, 1911.

The corvette flotilla is intended to perform or support the following missions and tasks: (1) local ASW and ASUW for an approaching force from the sea; (2) escort high value targets (HVTs) near the terminal points of ingress and egress; (3) provide ASW and ASUW support for choke point operations; (4) perform airborne or limited TLAM strike operations; (5) provide a landing and takeoff platform for various small to medium sized joint air assets; (6) maritime embargo, blockade, quarantine, interdiction; (7) multi-national maritime cooperation; and (8), perform a host of non-traditional missions. Chapter V amplifies on each of these areas.

As a point of departure, TABLE 2 portrays a comparison of typical combat system capabilities presently onboard small combatants. The data are a "composite" of a number of existing corvette-type ships.<sup>13</sup>

TABLES 3 and 4 then synthesize these average capabilities of today with emerging or anticipated technologies of tomorrow, in order to highlight the principal characteristics of the postulated corvette. It must be noted that the capabilities envisioned for this 1,500 ton corvette are unsupported by any present engineering or design studies.<sup>14</sup>

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<sup>13</sup>Data is a composite from the Ninety-sixth edition of Jane's Fighting Ships, Jane's Information Group INC., edited by Sharpe, R., Capt, RN, 1993, provided by Larrie Ferreiro, Navy International Programs Office (IPO) - 03A.

<sup>14</sup> It is necessary to determine if the capabilities as envisioned are overly optimistic, and if so by how much. 15 to 20 percent difference between desired and technically feasible might be acceptable, whereas 50 percent could prove too much.

TABLE 2 - TYPICAL 1500, 2500, AND 3500 LIGHT TONS (LT) CAPABILITIES

	<u>1500 LT</u>	<u>2500 LT</u>	<u>3500 LT</u>
Length	280 feet (ft)	360 ft	380 ft
Trial speed	25 knots (kt)	27 kt	28 kt
Cruise speed	15 kt	17 kt	17 kt
Range @ cruise	3800 nautical miles	5000 nm	5500 nm
Crew size	100	150	160
Sea keeping	Coastal	Offshore patrol	Open ocean
Stealth	NO*	No	Yes
Propulsion	CODAD (2 dies) or CODOG = (2 dies / 1 GT)	CODAD (4 dies) or CODOG (2 dies / 2 GT)	CODAD (4 dies) or CODOG (2 dies / 2 GT)
AAW self-defense	1 x CIWS 1 x RAM**	2 x CIWS 1 x RAM**	2 x CIWS 1 x RAM**
AAW local area defense	None	None	VLS Seasparrow (extended range)
Surface - surface	8x SSM	8 x SSM	8 x SSM
ASW weapons	1x ASW Mortar 2x Torpedoes	2 x Torpedoes	2 x Torpedoes
Guns	1x 76 mm	1 x 100 mm	1 x 127 mm
Sonar	SQS-56 (1m dome) No VDS***	SQS-56 VDS (sometimes)	3m hull dome VDS / TACTAS
Helicopters	1 x small helo	1 x small helo	1 x medium helo

\* Sa'ar 5 has stealth features,

\*\* or the equivalent short range missile (ie: NSSM, Barak, Crotale)

\*\*\* this is an average, for example Singapore' corvettes of 500 tons have VDS

TABLE 3 - GENERAL CORVETTE PROPOSED CHARACTERISTICS

Displacement	1500 tons, full load
Length	280 feet
Draft	11 feet
Propulsion	CODOG
Endurance	3800 NM at 15 knots
Stores	20 days
Crew	50 personnel
Cost	\$200 million
Operational availability	80 %

TABLE 4 - DESIRED CORVETTE COMBAT CAPABILITIES

Stealth	Low RCS, exhaust dispersion, LPI onboard sensors, primary detect, track, engage from external sources, prairie - masker anti-submarine protection.
Combat systems	<b>Fixed:</b> (4) Harpoon SSMs, (2) 20 mm gatling guns, bow mounted 76 mm gun with 400 rounds (1) CIWS, (2) SRBOC launchers with TORCH / Nulka decoy canisters, (32) vertical launched RAM anti air (AAW) missiles, (1) shoulder STINGER, Variable Depth Sonar (VDS), (6) ASW torpedoes, <b>Optional:</b> (4) topside angled Tomahawk launchers ( 2 port, 2 starboard), mines and/or depth charges
Chemical / biological	Citadel concept in designated areas
Aviation	Landing pad (up to SH-60s), UAV refueling Sea state
Sea state (SS)	mobile - SS 5, combat capability degrades above SS 4

Even a cursory comparison of these three tables points out several glaring differences between what presently exists and the postulated 1,500 ton craft. Perhaps the six most glaring and suspect are: (1) most small ships in the 1,500 ton range are not intended to operate far from the shore for extended periods of time; (2) the additional topside weight and volume caused by the addition of four TLAMs, presenting implications for ship size and RCS; (3) the desire for a medium vice small helo launch and recovery capability; (4) the absence of a bow mounted sonar, with reliance on VDS instead; (5) the primary reliance on external sources of

radiated energy for detect / track / engage capability; and (6), crew size is one-half to one-third that of crew complements on similarly sized ships today.

It is postulated that for presence purposes, six to ten corvettes, aircraft, and a mother (tender) ship will comprise a flotilla. This number is predicated on the following base loss formula (BLF) and assumptions:<sup>15</sup>

$$BLF = \frac{N}{n} = \frac{1}{b} \left[ \frac{1 + \frac{T_{Tr}}{T_{St}} \cdot N_T}{1 - N_M \cdot N_T} \right]$$

*Definitions*

$T_{Tr}$  = two-way transit time

$T_{St}$  = time on station

$\frac{1}{b}$  = overhaul coefficient\*

$n$  = on station requirements

$N$  = total requirements

$N_T$  = training coefficient

$N_M$  = % platforms not available

For the purposes of this example, four corvettes are to maintain station for three, four, or five, days, at various distances from the mother ship (200 nm, 100 nm, 50 nm), using a 15 knot speed of advance (SOA) to station. Only trained crews are

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<sup>15</sup>Santa Fe Corporation, "A Conceptual and Analytical Study of the Utility of Speed in Naval Operations," p. A-2, vol II, July 1976, prepared for Director, Systems Analysis Division (OP-96) Office of the Chief of Naval Operations, Department of the Navy. Formula is a generalized BLF equation, useful to compute the number of platforms required to maintain a minimal number on station.

deployed, so the training coefficient is negligible, and the percentage of platforms available is computed using an 80 percent operational availability (percentage of time the ship is mission capable). 80 percent is used for the overhaul coefficient  $b^*$ , whose reciprocal ( $1/b$ ) is the fraction of platforms out-of-overhaul.<sup>16</sup> The percentage of platforms not available is computed at 20%.

Based on these assumptions, the impact of transit distances (nautical miles) and the number of platforms required on station can be used to determine the number of corvettes required in the flotilla. TABLE 5 reflects the results:

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<sup>16</sup>IBID, p. A-1. The corvettes are allocated three to four weeks of time off station in a dedicated availability every 6 months, and a one week dry docking contingent on the location, approximately every 3 years.

TABLE 5: RESULTS OF BLF FOR REQUIRED NUMBER OF CORVETTES

Ships on station (n)	Distance to station	Time on station / Mission time	Ships required (N)
4	200 nm	3 days / 4 days + 3 hours	9
4	200	4 days / 5 days + 3 hours	8
4	200	5 days / 6 days + 3 hours	8
4	100 nm	3 days / 3 days + 14 hours	8
4	100	4 days / 4 days + 14 hours	7
4	100	5 days / 5 days + 13 hours	7
4	50 nm	3 days / 3 days + 7 hours	7
4	50	4 days / 4 days + 7 hours	7
4	50	5 days / 5 days + 7 hours	7

It is essential to keep the crew size small, and the corvette is envisioned to be manned by a crew of not more than 40 - 50 personnel.<sup>17</sup> This complement allows for three-five days on station. At the end of the patrol, the corvette transits back to the mothership, whose location is dependent on the nature of the local threat capability. Note that the total mission time is less than seven days.

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<sup>17</sup>The Israeli SA'AR 5 with a displacement of 1200 tons operates with a crew of 64 to 74, depending on the air complement. The postulated corvette is envisioned to incorporate more automated capability than the present SA'AR 5, thereby bringing down the manning level.

The flotilla's entire infrastructure is envisioned to remain afloat, the mothership anchoring offshore, mooring at a nearby host nation, or under extreme and adverse conditions, supporting the corvettes by transfer and replenishment at sea. The afloat nature permits as much independence as possible of any potential host nation complications, intending to facilitate the insertion of the corvettes, and when the time comes, packing them up and departing the area.

Because of the high tempo of operations under these conditions, a replacement "Blue / Gold" crew takes over at the end of six months. This scheme offers a complimentary alternative for the CINC to meet his presence requirements, as it mitigates the decreasing pool of ships and long transit times to AORs, providing greater ship utilization.

One factor not to be overlooked is the difficulty of maintaining crew proficiency in the various mission areas. To overcome this, the Blue / Gold "off crew" when free from normal operational responsibilities, would devote their duty time and effort to training and multi-mission proficiency.

The mother ship bases scout aircraft (year 2010 equivalents of SH-60F, HH-60 helicopters<sup>18</sup>) and unmanned aerial vehicles (UAVs) for surveillance and targeting. Each corvette provides a mobile flight pad capable of carrying, landing, or launching these aircraft, as well as minimal refueling capability only for the UAVs. The landing pad could also prove attractive in operations with various joint force packages.

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<sup>18</sup> SH-60s with fire and forget ASUW missiles and possibly airborne low frequency (LF) dipping sonar (ALFS), HH-60 Combat Search and Rescue (CSAR).

## B. ENDURANCE

In the age of sail, time at sea was mostly a matter of the prevailing winds, sea conditions, and the supply of onboard stores, especially water. It was not unusual for a ship to remain at sea for months before the need to replenish potable water and foodstuffs required the ship to make landfall. With the advent of steam propulsion came unprecedented tactical mobility for naval craft, yet also restricted strategic mobility. The inefficient steam engines of the early warships meant a new need for numerous coaling stations abroad. For this reason new ships continued to be rigged for "auxiliary" sail for some years. The development of more efficient propulsion plants negated the necessity for sailing power, yet even today, every ship forward deployed still depends on reliable replenishment in-port or at sea .

The propulsion system for the proposed corvette will be a hybrid diesel and gas turbine configuration (CODOG) , allowing greater endurance at low to moderate speeds, while providing the capability for high speed sprints when required. The U.S. Navy has had CODOG experience from the early 1970s thanks to the 165 foot, 260 ton PG 84 Class Patrol Gunboat.

Maximum range is estimated to be 3,800 nm at a cruising speed of 15 kts. Since many missions in littoral waters are likely to require long periods of slow speed (5-10 knots), the ship could operate on station, without refueling, for up to 25 days, using its diesels. The corvette should be capable of taking on fuel or stores from any naval ship, as well as from those of most NATO allies.

But endurance is measured by much more than merely gallons per mile steamed. Perhaps more importantly, the crew (stores, rest) and maintenance (spare parts, repair time) requirements dictate just how long a naval force can maintain station. Crew endurance will be the governing factor under arduous tasks such as blockading, boarding, and inspecting. Lastly, because of the inherently smaller ordinance loadouts, replenishment in time of hostilities would possibly be more frequent. Each of these areas are further addressed in Chapter III.

The mothership must be designed with two thoughts in mind. First, although it is intended to remain outside the area(s) of contention, the ship must have self protection and staying power. Second, the mother ship must be able to furnish almost all of the corvette's sustainment needs, as the corvettes have a negligible self-maintenance capability. From topping off reefers, to conducting engine or combat system module change-outs, the mothership will be designed to reduce reliance on host nations and/or other fleet assets. Typical ship characteristics of the mothership might be: 20,000 ton displacement, length 650 feet, and a range of 6,000 nm at 23 knots.<sup>19</sup> For the purpose of the thesis, unit acquisition cost is postulated to be \$700 million.

The mothership concept poses obvious vulnerabilities. As mentioned earlier, it will typically remain out of harm's way, since a loss could entail the "catastrophic degradation" of the flotilla's combat capabilities as a whole. The thesis only makes

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<sup>19</sup>Meyer, V.A., and Hopkins, W.J., Naval Surface Warfare Center (NAVSWC), "Conceptual Ship Characteristics and Capabilities," [date unknown], p.III-8, a sample mothership design (LX(M)).

reference to the issue; further research will need to throw light on the liabilities that may be incurred by "over-dependence" on motherships.<sup>20</sup>

### C. STEALTH

The likely impact of stealth technology in the twenty-first century is not yet fully appreciated. Its application for surface ships is multidimensional, and each dimension must be considered. All spectrums must be masked, including noise, infrared (IR) signature, radar cross section (RCS), and wake. As success is met in one area, potential opponents are likely to concentrate on exploiting different weaknesses. Operating in the littoral, will place a premium on stealth characteristics.

Various applications are being evaluated to minimize vessel detectability. The proposed corvette has a small radar cross section (RCS), while presenting minimal freeboard, sloped surfaces, and radar absorbent materials (RAM). The corvette's electronics will normally operate in a passive mode, as Space Electronic Warfare (SEW) assets, scout aircraft, and Aegis DDGs/CGs will provide it with primary detection, threat warning, and weapon cuing inputs. The corvette's combat system integrates this external information with onboard sensors, such as infrared search and track (IRST).

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<sup>20</sup>Uhlig, F., Vietnam: The Naval Story, p.324, Naval Institute Press, 1986. For example, during the Vietnam War, motherships often had difficulty finding suitable anchorages, that were deep enough. Also useful would be to examine the U-boats' dependence on the "Milk Cows" (U-tankers).

#### D. SURVIVABILITY

Presence can be a demanding business when contested. Future threats to any ship operating close to hostile shore will potentially be intense, multidirectional, and not necessarily of a naval origin. Corvettes will usually not survive a direct missile hit, but then neither will larger combatants, as evidenced during the Falklands Conflict.

The question is often asked how these ships will perform in a high threat environment. Corvettes, or any ship for that matter, are not immune to the dangers of operating in restricted waters. But the flotilla synthesizes and exploits existing and anticipated technologies: the ships combine adaptable combat system modules, stealth applications, low probability of intercept (LPI) sensors, CITADEL positive air pressurized spaces, and external tracking and weapon cuing systems into one combat package. Most important, it is to be remembered that the value of the concept is to be measured by the synergistic effectiveness of the flotilla as a whole. Corvettes are designed to be small, with small crews, so that in a scenario with a high probability of loss, they can be sent to perform the dangerous missions.

In conclusion, an extraordinary 35 percent of this ship's 1,500 tons will be dedicated to pure warfighting capability, because less weight and space need be devoted to range, endurance, and habitability. With a long-range detection, tracking, and engagement capability, the naval corvette can be a force multiplier, augmenting the CINCs concentration of forces in both space and time. The bottom line repeats an old maxim: battle in the littoral will be most often be won by the side

which scouts the best, and is the first to fire effectively.<sup>21</sup> The corvette flotilla fits that bill.

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<sup>21</sup>Hughes, W.P., Jr., Capt USN (Ret), Fleet Tactics, p. XV, Naval Institute Press, 1986. Naval Institute Press.

### III. SMALL SHIPS - TRUTH AND MYTH

Superiority in courage and skill combined can wrest victory from great odds, and no amount of skill will atone for the lack of daring, of unflinching resolution, and of dogged capacity to stand punishment; but where courage is equal, skill will always win; and where courage and skill are both equal, then the side which has the best ships and guns will overwhelm the other, no matter what may be the flags under which the combatants fight.<sup>22</sup>

Throughout the twentieth century, the United States has earned a reputation for sailing the high seas with warships of the highest capabilities. These ships have come in various sizes, shapes, and configurations. However, what stands out in the minds of most, are the large, powerful, and expensive descendants of eighteenth century ships of the line, namely battleships, aircraft carriers, and today's Aegis warships. These prestigious capital ships combine the highest qualities and ratios of speed, firepower, and endurance.

Since no nation possess unlimited resources, determining the correct number, capability, and mix of surface warships, has always proved elusive. The dilemma often centers around the question of quality vs. quantity, specifically how to build, maintain, and operate extremely capable and expensive ships, adequate in number to persevere during conflict, while also having enough ships to accomplish a myriad of peacetime commitments.

This should come as no surprise, considering that on one hand the decision maker must prioritize among shifting geopolitical, fiscal, domestic, and technological trends, while on the other hand he must strive to reassess the relative value of

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<sup>22</sup>Roosevelt, T., The Naval Operations of the War Between Great Britain and the United States, p. 97, Sampson Low, Marston & Co., LTD

particular warship qualities. No virtues can be considered sacrosanct, a few examples being: costs in time, dollars, and manpower; displacement / volume; stealth / detectability; firepower, staying power, defensive power, endurance, and habitability. In choosing forces to perform forward presence missions in the future, the criticality of making the "right choices" can not be overemphasized.

The solution in the past has been to complement the "core" fleet of big ships with sloops, frigates, and destroyers. These smaller, less capable commerce raiders and/or protectors, were "to be used primarily, but not exclusively, to protect and assist the capital ships in carrying out their appointed mission of opening up the way for devastating attacks on the seaboard and merchant shipping of the enemy country."<sup>23</sup> Times and circumstances have changed, but naval warfare still requires fleets with a balanced mix.

Could smaller warships, produced and dispersed in greater numbers, be effective simply because there are more of them? The question has been asked throughout naval history?

#### **A. PAX-BRITANNICA**

After the Napoleonic wars, Britain embarked upon a period of relative stability, known as the Pax Britannica. During this time, Britain was able to maintain a balance of power throughout Europe by wielding influence through a combination

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<sup>23</sup>Sprout, H. & M., The Rise of American Naval Power 1776-1918, p.287. Command of the sea through Battle fleet supremacy.

of international commerce, finance, diplomacy, and sea power. This era is of interest as several dilemmas facing decision makers then are apropos today.

The Royal Navy entered the era with nearly an 800-ship battle tested navy, having defeated in succession, the Spaniards, Dutch, and the French. Of this battle fleet, several hundred vessels were classified as capital ships, with no comparable challenge on the high seas. Without a direct threat, and because of constant fiscal pressures, the fleet was progressively reduced in size.

During this era the British Admiralty did not guard the Empire's global sea communication by scattering its men-of-war around the world by ones and twos. With superiority in capital ships, the British had little to fear from enemy fleets, and was free to convoy their merchantmen with moderate frigate and corvette forces, as the cruisers, aided by privateers, blockaded enemy ports, patrolled the sea lanes, and either destroyed or drove them from the seas. To maintain British influence abroad, squadrons of smaller ships were maintained in four major geographical "hubs:" the West Indies, Cape Horn, Eastern Asia - Australia, and the Mediterranean. These squadrons earned their keep, as scarcely a year went by when they were not engaged in some active operations, especially the cleaning up of the slave trade and piracy.

During the period of 1816-1856 there were "no great pitched battles with formidable foes; and although the period is that of Algiers, Navarin, St. Jean d'Acre, and Sebastopol, it was more a period of small wars with uncivilized peoples, of

steady, but nearly noiseless extension of empire, and of the onerous policing of the ocean."<sup>24</sup>

Although the smaller frigates and gunboats did a superb job policing and influencing truculent subjects, they did so at the cost of building and manning fewer ships of the line. The success of the wisdom is debatable, but at least one historian points out that it possibly weakened the fighting power of the Royal Navy.<sup>25</sup> By the early 1900's, under reforms driven by Admiral Fisher, "nothing was viewed as preposterous than the maintenance of vast numbers of slow, obsolescent small cruiser and gunboats all over the globe, wasting money and especially men." Fisher argued that in time of war, "An enemy cruiser would lap them up like an armadillo let loose on an ant hill!"<sup>26</sup>

The lesson for the future is that despite what ever success a fleet may have enjoyed abroad, leaders must continually reassess the various warship attributes, and remember that nothing is sacrosanct. The essence of any warship is its ability to seize, control, and deny, all else is secondary. Although the British cruisers, sloops, and gunboats had performed well over the decades, in time circumstances negated their utility.

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<sup>24</sup>Clowes, Wm. Laird, The Royal Navy, A History, Vol VI, p.vii, Sampson Low, Marston and Company, 1901.

<sup>25</sup>Kennedy, Paul M., The Rise and Fall of British Naval Mastery, p. 171, Scribner, 1976.

<sup>26</sup>IBID, p.217.

## B. EARLY AMERICAN

The present composition and employment of the American fleet bears little resemblance to anything the nation maintained before the Twentieth Century, yet several naval constants warrant mention.

There was a lack of enthusiasm in supporting a standing naval force in early America. After the War of Independence, the small Continental Navy was deemed "an expendable luxury," and the few remaining vessels were sold off.<sup>27</sup> Even with the adoption of the new constitution a few years later (1789), Congress chose not to "provide and maintain a Navy," relegating naval appropriations to the maintenance of the national debt.

Meanwhile, American merchant shipping expanded in the Mediterranean and Caribbean Seas. Both places were notorious for piracy, and without a naval force to protect American interests, the nation had little recourse. In the case of the Mediterranean, this brought on the paying of tribute to the corsairs of the Barbary Coast.

Despite opposition from the Jeffersonian Republicans, Congress decided to put a halt to the pirate's preying, and passed the Naval Act of 1794. This Act provided funding for the nation's first warships, three "super 44" and three "36 gun" frigates. The appropriations were contingent upon the threat from the Barbary pirates; should a peaceful settlement be reached, construction was to be cancelled.<sup>28</sup> But the

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<sup>27</sup>Potter, E.B. & Nimitz, C. W., Sea Power, a Naval History, p.187, Prentice Hall, 1960.

Federalist War Department harbored broader ambitions, and commenced a program to build not six frigates, but six "top of the battle line cruisers," and three frigates. However, peace with the pirates was declared in 1796, and perhaps in a twist of fate, President Washington somehow persuaded Congress to continue construction of the three frigates.<sup>29</sup> These frigates, launched in 1798, were the finest ships of their class, yet operating singly, they would quickly prove inadequate for the tasks at sea.

During the Quasi-War with France (1798-1801), the navy was tasked to protect and escort merchant convoys against the marauding privateers in the Caribbean. A few frigates were initially sent, but met with only limited success. It quickly became obvious that smaller ships, in ample quantities, were needed to blockade the various hostile ports, and conduct operations in the shallow waters. In response, Robert Stoddert, President Adam's Secretary of the Navy, built up two Caribbean squadrons, each comprised of one to two frigates, and three or four smaller ships (sloops, brigs, and schooners). The result was that the American fleet could pursue the small, swift, and shallow draft privateers, and contribute effectively to bringing the problem to a conclusion.<sup>30</sup>

From 1801 to 1805, the Nation, under President Jefferson, sent a series of naval squadrons to deal with the Barbary Pirates. The Tripolitan War highlighted the difficulties of maintaining a forward presence several thousand miles abroad.

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<sup>29</sup>Weigley, R.F., The American Way of War. A History of United States Military Strategy and Policy, p.42, Indiana Univ. Press, 1973.

<sup>30</sup>Potter, p.189.

<sup>30</sup>Uhlig, F., How Navies Fight, p.13, Naval Institute Press, 1993.

Despite several victories, the few ships were largely ineffective again, simply because their number was too small for all of the duties assigned, which included not only blockading, but the escorting of merchantmen.<sup>31</sup> The United States eventually reverted back to the paying of tribute.

One effect from this episode was the re-discovery of the need for several small ships to work with the larger frigates. Smaller ships were able to operate in the shallower waters and perform various tasks which the larger ships were ill-suited. This freed up the larger ships to operate in areas where their influence could be more appreciated.

During this time, President Jefferson cancelled the few naval construction plans for larger ships of the line (74s), in favor of a large fleet of tiny coastal defense gunboats. Costing only a few thousand dollars each, the price appealed to Jefferson's fiscal concerns; Congress authorized 25 boats in 1805, 50 in 1806, and 188 in 1807. All but six to eight of these boats were to be laid up until time of war, at which time over 200 of the gunboats would sortie in defense of the Maine to Louisiana coastline.<sup>32</sup> These gunboats were strictly defensive, intended only to protect the American seacoast from invasion. They were never intended for extended operations on the high seas, as their cannons had to be stowed in the hold even during a minimal sea-state.

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<sup>31</sup>LaFeber, p.52.

<sup>32</sup>Sprout, The Rise of American Naval Power, p.58.

With tensions building prior to the outbreak of the War of 1812, Paul Hamilton, President Madison's Secretary of the Navy, pointed out the short comings of the gunboats. But his foreboding went unheeded, and with the War of 1812, the economy fleet floundered against the thick sided British frigates. The fifty footers, by any measure, proved impotent, as the Royal Navy was successful at not only blockading the entire eastern coastline of the United States, but was also able to invade any coastal port. The "raiding, looting, burning, and general disruption of life along the Delaware River and Chesapeake Bay," demonstrated that against a formidable naval power, small gun ships are inadequate.<sup>33</sup>

Now consider the brief but significant successes of the 16 other commissioned vessels, of which seven were frigates, and the rest were corvettes, sloops, and brigs. Each of these American ships often carried more guns than they rated, and with their courage and daring, proved superior in force, winning many of the initial battles.<sup>34</sup> Following several devastating engagements, the British forbade their "18-pounder" frigates from engaging the "24-pounder" American frigates singlehandedly, and required their ships to cruise in couples or small squadrons when possible. These restrictions were to increase their odds of overpowering any American antagonists.<sup>35</sup>

Although the American small ships fought heroically for the first nine months of the war, they lacked the numbers to win decisively. Still, "... the triumphs of the

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<sup>33</sup>Weigley, p.51.

<sup>34</sup>Roosevelt, pp. 42-43.

<sup>35</sup>Ibid, p.103.

American squadrons on the lakes, and the frigates and sloops on the oceans, and the ruthless harrying of the British trade by the American commerce-destroyers, inflicted such severe punishment as to make the British willing to call the fight a draw.<sup>36</sup>

Following the War of 1812, Congress sold off the gunboats, and authorized four 74s, six "44 gun" frigates and six sloops. But this turned out to be a passing moment; come the recession of 1816, the heavier frigates and ships of the line, which required larger crews and were expensive to maintain, were cancelled. This time it was considered prudent to employ sloops and schooners, supported by a few large ships.<sup>37</sup>

The War of 1812 pointed out several fallacies that are applicable today. A few are noted: (1) nothing can compensate for a lack of adequate preparation and training prior to the outbreak of hostilities; (2) most battles are fought on a "come as you are" basis; and (3) small "economy fleets" are not a solution for anything; (4) a few extremely capable ships will not always be adequate to guarantee success in battle.

### C. MAHANIAN INFLUENCE

Until the late nineteenth century, commerce raiding and coast-defense were the basis of American naval strategy. Thanks to technological innovation, and Alfred Thayer Mahan's "*Influence of Seapower on History*," the idea of a permanent American fighting fleet came into vogue. Mahan, along with national leaders such as Henry Cabot Lodge and Theodore Roosevelt, insisted that the navy was not merely for

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<sup>36</sup>Roosevelt, p. 285.

<sup>37</sup>Sprout, The Rise of American Naval Power, p. 87.

defense, but was to be used as an instrument to promote national interests. They insisted that a great navy made up of powerful battleships was necessary for the Nation to reach its potential.

After the Spanish-American War, a U.S. Navy of capital ships grew rapidly, becoming second only to the Royal Navy in terms of tonnage and numbers of battleships. The build-up peaked as naval appropriations tapered off during President Roosevelt's second term, Taft's administration, and President Wilson's first term. What stands out, is that with what money was appropriated, the nation neglected to build smaller vessels so as to be able to build a few big ships. Ironically, most of the responsibilities abroad were being met by smaller cruisers and destroyers.

#### **D. WORLD WAR I**

The small ships that were necessary to protect the allie's ocean-going traffic were found to be in short supply. As the Germans sought to sever their opponent's Atlantic and Mediterranean life arteries, it became obvious that many small combatants, in the form of destroyers, sloops, and gunboats, not more battleships, were needed.

The Royal Navy imposed a so-called "distant" blockade on the German High Sea Fleet from the first day of World War I. The blockade was generally effective, but the Royal Navy and allied shipping were to meet their challenge elsewhere. Within a few short months of the war, U-boats with torpedoes and mines were operating in all of the waters surrounding the British Isles, Western France, and in the Mediterranean.

The critical waterborne flow of allied war materials and resources quickly became tenuous, as the U-Boats began sinking hundreds of thousands of tons of shipping.<sup>38</sup>

When the United States entered the war in 1917, American ship construction, which for years had been devoted to building capital ships, rapidly shifted to the production of much needed small submarine hunting destroyers. Supporting the war in Europe, several shipyards met the task, for example one yard reputedly built destroyers in as few as 75 days.<sup>39</sup> The main task of the Navy, would prove to be the unglamorous, yet necessary, protection of tankers and transports.<sup>40</sup> Six American destroyers sailed for Britain on April 24, 1917 and within three weeks were assisting with anti-submarine operations. As the patrols shifted their efforts from solely hunting the submarines to the escorting of convoys, over one-half of the entire American destroyer force became involved (34 of 68).<sup>41</sup>

Although limited in capability, these ships were always in short demand, as their duties were divided between supporting fleet operations and protecting convoys in the Atlantic, North Sea, Strait of Dover, and Mediterranean.<sup>42</sup> In time, the protected convoys overcame the U-boats.

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<sup>38</sup>Within three months of declaring unrestricted submarine warfare, the U-boats sank 470 allied ocean going ships and over 500 coastal freighters.

<sup>39</sup>Weigley, p.194.

<sup>40</sup>Uhlig, How Navies Fight, p.100.

<sup>41</sup>IBID, p. 93.

<sup>42</sup>IBID, p.86.

## E. HI/LOW DEBATES OF THE 1970s

Although the Navy had been the principal foreign policy tool for years, a recurring theme during the 1950s, 1960s, and the 1970s was "we will have to do more with less." Than as operations off of Vietnam began to take their toll, money was often diverted from shipbuilding, maintenance, and modernization to fund ongoing fleet operations... annual official Navy posture statements warned of adverse trends, but an illusion of overall superiority was officially maintained.<sup>43</sup>

In the early 1970s, then Chief of Naval Operations (CNO), Admiral Zumwalt struggled to find the correct mix, size, and direction for the U.S. Navy to meet its global commitments. He became concerned that the insistence on only the highest quality and most expensive weapon systems, would lead to insufficient fleet numbers. His "solution" was to advocate a "Hi/Lo Mix" force structure, which emphasized the potential of (relatively) low cost and less capable ships. These moderate performance ships would allow the fleet to have enough ships to be "in places at the same time to get the job done."<sup>44</sup>

Zumwalt's high-end ships were to have operated up front in so-called high-threat areas, while the low-end ships would guard the "low threat" transatlantic sea lanes of communication (SLOCs).

Despite Admiral Zumwalt's Hi/Lo concept, Congress voted for a large ship navy. Smaller, less capable vessels were seen as desirable, but since they were assigned lower priorities, they were generally cut from the budget (FFG-7 class is one

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<sup>43</sup>Lehman, J. Jr., Command of the Seas, pp. 95 & 117, Charles Scribner's Sons, 1988. Quote by Admiral Zumwalt.

<sup>44</sup>Ryan, P., First Line of Defense, The U.S. Navy Since 1945, p.75, Hoover Institution Press, Stanford University, 1981.

notable exception). The Hi requests were either met or even increased. Many follow on CNOs, such as Admiral Hayward discounted the Hi/Lo concept, viewing the lo end being set too low, and reintroduced the philosophy of building maximum capability into ships. Hayward believed there was no room for compromise, as marginal, cost-effective ships, "were predisposed to end up as seagoing coffins."<sup>45</sup> The U.S. Navy depended on a favorable combat advantage, as any war of attrition was doomed to fail.

The corvette proposed in this thesis is not to be confused with Zumwalt's Hi/Lo concept. This postulated corvette is intended to steam in front, leading the fight in littoral waters. The lo is not set too low, and although the ships cannot do everything that a larger more capable combatant can, the flotilla offers a synergistic and complementary addition to any battle force.

#### **F. FAST ATTACK CRAFT (FAC) vs CORVETTES**

FACs and corvettes are the surface warship of choice for many navies of the world, as they offer the advantage of good striking power at economical cost. Both types of vessels have shortcomings, but what distinguishes the corvette from the FAC is the corvette's better seakeeping performance, longer endurance, and operational versatility. For example, corvettes are not confined to coastal operations, and do not "necessarily sacrifice AAW and ASW capability merely to mount an ASUW

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<sup>45</sup>IBID, p.173.

function.<sup>46</sup> For these reasons, FACs came to be seen as inadequate in meeting the needs of many nations that had purchased them.

By the mid - 1970s, the dominance of the 160 - ton FACs began to give way to the near 400-ton fast patrol boats, and by the 1980s, an increasing number of navies began acquiring corvette-sized (500-1,000 ton) ships.<sup>47</sup> This is attributable to the fact that FACs are generally single-role vessels, dedicated to the anti-surface warfare (ASUW), to the neglect of other missions such as ASW, escort, or patrol duties.

FAC mission effectiveness during the 1967 and 1973 Middle East Wars has been amply documented, but since 1980, small craft have not fared well as evidenced by the quick destruction of Libyan (March 1986 - Gulf of Sidra), Iranian (October 1987, April 1988), and Iraqi (Desert Storm - January 1991) small boats. Their loss revealed that the smaller FACs are highly vulnerable due to a lack of state of the art point defense weapons, sensors, or decoys.<sup>48</sup>

Incorporating sophisticated tactical data systems (TDS), enhanced weapon suites, and electronic data link capabilities, corvettes overcome many of these shortcomings. Most corvettes are able to perform in at least two of three primary mission areas (ASW, ASUW, and/or AAW), with fire control systems and typical weapon loadouts containing surface to surface missiles (SSM), 76 mm gun, point

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<sup>46</sup>Todd, D., Lindberg, M., "The Trend Towards Replacement of FACS With Corvettes," p. 284, Navy International, September / October 1993.

<sup>47</sup>Todd, p.286.

<sup>48</sup>Brower, K., Kehoe, J.W., Captain, USN, (Ret.), Naval Engineers Journal, p.131, July 1993. authors replying to comments made by Cdr P.E. Sullivan, USN.

defense surface to air (SAM) or close in weapon system (CIWS), and ASW torpedoes.<sup>49</sup>

The new coastal patrol boat (PBC) is not to be confused with a corvette or even a FAC. The PC varies significantly from the combat "sea denial" characteristics of a FAC, although these two ships are similar in overall dimensions. The PC's austere combat suite is not commensurate with its primary mission of coastal patrol and interdiction, though it fits the secondary mission of covert special warfare operations. The PC lacks punch, as its mission envisions larger combatant fire support and existing control of the seas.<sup>50</sup>

#### **G. ADVANTAGE IN NUMBERS**

As important as the per unit cost is the advantage associated with the numbers of combatants. Since the flotilla normally operates electronically passive (EMCON A) and is dispersed, an adversary faces an uncertain number of "silent" platforms, all of which he must attempt to detect, track, and engage. When having more "blips" to account for in a larger target area, a potential adversary must either disperse his fire, or concentrate it on a few ships, leaving others disengaged. This dispersion spreads the risk for the corvette force.

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<sup>49</sup>Todd, p.288.

<sup>50</sup>McCartney, F.N., Program Engineer, Patrol Coastal Program, Naval Sea Systems Command, p.128, Naval Engineers Journal, July 1993. Commenting on an article by Brower, K., Kehoe, J.W., Captain, USN, (Ret.), "Fast Attack Craft - A Comparative Analysis."

Wayne Hughes, Jr. has presented a "Fractional Exchange Ratio" (FER) as a method to compare warship attributes in today's uncertain environment. FER assumes that the circumstances under which a warship will fight, including the attributes of the adversary, are unknown. The FER approach pits alternative candidate designs against each other, for which the design attributes are known instead of speculated on the attributes and numbers of units of a hypothesized enemy. The key attributes that bear heavily on modern naval combat are as follows:

Striking power (the number of accurate (good) shots launched)  
Staying power (ability of ship to absorb hits and remain fighting)  
Counterfire (defensive firepower),  
Scouting effectiveness (detection and targeting)  
Softkill counteractions  
Defensive readiness  
Training, organization, doctrine, and motivation<sup>51</sup>

Hughes points out that the attribute which is consistently the most advantageous in force-on-force engagements is the number of combat units: "For example, if forces engaged on side A are twice as numerous as side B, then for combat parity, each unit of side B must have twice the striking power, twice the staying power, and twice the defensive firepower of each of side A's combat units. This combat advantage of numbers seems to apply under a very wide set of circumstances."<sup>52</sup>

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<sup>51</sup>Hughes, W.P. Jr., "The Value of Warship Attributes in Missile Combat," p.39, Naval PostGraduate School, 1 October 1992.

<sup>52</sup>IBID; p.40.

Hughes also points out that because of an "expanding cumulative advantage," the "rate of casualties imposed is proportionate to the number of forces remaining, with the ratio continuously increasing in favor of the stronger [more numerous] initial force."<sup>53</sup> In an engagement in which all enemy units are known and within range, the commander is better off with twice as many units of force than with units of twice the rate of effective "firepower."

In addition, eight contacts are harder to detect and track, much less to engage, than of only one or two. Due to the lethality potential of the eight ships in the flotilla, the adversary can ill afford to neglect any, since each unit has the firepower to engage four of the enemy. All combined, the corvette flotilla has the the capability to damage more than their apparent weight would suggest. Just as ship of the line tactics called to concentrate firepower through the use of columnar formations, the flotilla's effectiveness depends on the combined effect of force.

#### **H. SMALL DOES NOT EQUAL CHEAP but DOES EQUATE TO MANY**

There are opportunity cost involved by building corvettes, such as the diverting of funds from other projects and unknown implications for coercive diplomacy (see Chapter V). But quite a few capable corvettes can be mass produced fairly quickly at a relatively inexpensive price. Taking advantage of the various technologies available, the corvette flotilla warrant consideration with the increasing emphasis on fighting in the littorals. Bowing to fiscal demands, the \$200 million a

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<sup>53</sup>Hughes, W.P., Jr., Capt USN (Ret), Fleet Tactics, p.36, Naval Institute Press, 1986.

copy could be further reduced by using the prototype to replace the aging Coast Guard cutter fleet, and a less capable version could be competitive in the export market.

Let us examine in rough terms the cost of an eight corvette flotilla with a mothership: An equal cost bundle comparison between (3) DDG-51 Arleigh Burke class destroyers and (8) corvette type ships with a mothership can be demonstrated as follows. Acquisition costs for the flotilla is

mothership - (\$700 million / ship) x (1 ship) = \$ 700 million

corvette - (\$200 million / ship) x (8 ships) = \$1,600 million

flotilla acquisition costs = \$2.3 billion

Considering \$800 million for a DDG, an equal cost bundle roughly equates to three DDG's, offering a combatant ratio of eight corvettes to three DDGs. The relevance of this difference in numbers is apparent when considering that of the eight corvettes, an average of six are typically maintained on station (eight times 80 percent availability), forward deployed. Of the three DDGs, one is on station forward deployed, while the other two are in various stages of training, transit, or maintenance. The corvettes involve tradeoffs, such as shorter time on station, less staying power, and the need for a mothership, but there are six separate capable ships, either in six physically different areas or operating cooperatively together.

Similarly comparing the personnel side of operational costs:

mothership - 600 personnel per ship [ 225 operational + 375 repair personnel ]<sup>54</sup>  
corvettes - 50 personnel per ship (times eight ships) (times 2 crews) = 800  
flotilla subtotal = 1400

DDG-51 - 360 personnel per ship (times 3 ships) = 1,080

Although these hypothetical numbers do not count the flotilla's CONUS based repair or squadron personnel, the (3) DDG-51s require over 300 less personnel than the flotilla. The tradeoff from the additional personnel cost again comes from the benefits of having six operational combatants vice only one ship forward deployed.

An example of a tactical benefit was displayed in a thesis on shallow water anti-submarine warfare (ASW) by Martirano.<sup>55</sup> The thesis starts out hypothesizing that shallow water ASW involves short detection ranges, which requires direct screens made up of many active sensors. Using data from Ship ASW Readiness and Effectiveness Measurements (SHAREMS), Martirano calculated shallow water ASW measures of effectiveness (MOE) for hi and low frequency sonars. His results indicated that active sonar requires mutual support, and at an equal cost, small corvette flotillas could actively search a larger area than a DDG-51. Additionally, it is

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<sup>54</sup>Repair personnel rotate with shore intermediate maintenance activities (SIMAs) among three groups, 1 year ashore, 6 months deployed; operational crewmembers deploy for 6 months before being relieved by the CONUS based squadron, rotation working out to be 6 months deployed, 6 months CONUS, supporting the deployed flotilla.

<sup>55</sup>Martirano, J.P. Jr, Shallow Water ASW, A Two Stage Concept, p.51, Masters Thesis, Naval Postgraduate School, Monterey CA, September 1991. The thesis looked at 1,000 ton, five corvette flotillas with SQS-53 sonars.

pointed out that the dispersed units are able to free up the multi-mission blue water hulls for other missions.

## IV. NATIONAL INTERESTS

Although the term "national interest" rolls easily off the tongue, it is not a concept that leads to easy understanding or wisdom. This is understandable, considering that the process of projecting national interests is necessarily complex, as it must consider a diversity of interweaving factors, including uncertain shifts in the international order, newly defined geopolitical relations, and new domestic priorities. Nonetheless, an articulated vision of a nation's interests is critical, since it drives the formulation of the national strategy and the structure and role of military forces. This chapter makes one major assumption - that maintaining a robust American military, capable of responding when and where the nation deems necessary, is in the national interest.

Forward presence is one mission which has been declared of strategic importance in supporting and reenforcing our interests abroad as well as home.<sup>56</sup> Since the United States is a maritime nation that is dependent on overseas trade and raw materials, the Navy is expected to contribute actively in national growth and prosperity.

### A. GOALS

We the People of the United States, in Order to form a more perfect Union, establish Justice, insure domestic tranquility, provide for the common defense, promote the general Welfare, and secure the Blessings of Liberty to ourselves and our Posterity....

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<sup>56</sup>U.S. Department of Defense, Aspin, L., Secretary of Defense, The Bottom-Up Review: Forces For a New Era, p. 7, September 1, 1993.

It seems that all national goals should emanate, either directly or indirectly, from the ideals espoused in the Preamble of the Constitution. The National Security Strategy reenforces this, as it iterates that "The United States must ensure its security as a free and independent nation, and the protection of its fundamental values, institutions, and people."<sup>57</sup> Unfortunately, it is becoming harder to differentiate just who is "we" in "we the people." Some people fear that the country is fragmenting into a wide diversity of "ism's," each made up of various social classes, ages, and life styles, with no obvious national consensus. This is critical, as domestic and foreign policy concerns are inseparable. Given today's influences, the Nation probably would not fully embrace President Kennedy's inaugural address "we shall pay any price, bear any burden, meet any hardship, support any friend, oppose any foe." Nevertheless, retreat and isolation remain non-options.

The following three goals are envisioned: (1) enhance domestic economic competitiveness, (2) contribute to the emergence of a stable international order, (3) support the United Nations.

The first goal is an example of the domestic - foreign policy inseparability, as it acknowledges that the Nation's wealth, power, and prestige depend on the strength of its economy. The U.S. economy is about twice the size of that of the nearest competitor (Japan), with a GNP of nearly \$4 trillion a year and. Yet, the United States is also the world's largest debtor, with a \$4.5 trillion dollar debt. This issue has yet to be fully addressed.

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<sup>57</sup>National Security Strategy, p.3.

America's economic dominance in the immediate post-World War II era has evidently run its course; patterns of economic growth, global trade, money markets, percentages of gross world product (GWP), and capital flow<sup>58</sup> have shifted. For example, the total volume of world trade has more than doubled since 1980. Trade across the Pacific has exceeded that across the Atlantic for the last five years, and a RAND analysis predicts that the combined national products of the several East Asian Countries (Japan, China, South Korea, and Taiwan) will exceed the GNP of the United States by the year 2010.<sup>59</sup>

The increased economic strength of U.S. trading partners, notably Japan, China, and Germany, is expected to influence future security relationships also. Japan is unquestionably an economic superpower. It is now the world's biggest creditor, and is a large contributor of international aid.<sup>60</sup> China has the world's third largest economy, and could conceivably be number one by 2010.

Global resource distribution is expected to intensify in the Twenty-first century. Just as in the past, areas will be considered strategically significant if they control access to markets and raw materials. The amounts of cultivatable soil, forests, minerals, and water are finite; access will influence international growth and

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<sup>58</sup>Laurance, Edward J., The International Arms Trade, p.127, Lexington Books, 1992. a 1991 study by Morgan Stanley and Company said "the total demand for capital by Eastern Europe, Latin America, and the Middle East would exceed the Western worlds supply by more than \$200 billion a year in the next few years."

<sup>59</sup>Wolf, C., Long Term Economic and Military Trends, p.vi, RAND 1950-2010; N-2757-USDP, April 1989.

<sup>60</sup>Japan's overseas assistance is based on financial assistance, direct military assistance and cooperation is prohibited, for now.

development. The United State's is heavily dependent-on imported raw materials, and any disruption with the transport could have enormous economic and security implications.<sup>61</sup>

The biggest example is that the United States will remain dependant on foreign oil as domestic production declines and import percentages (approximately 40% Mid 1994) increase. What could change the strategic landscape here, is that Russia and Central Asia are entering the market, which in the future could decrease the West's reliance on Persian Gulf oil.

The second goal is "to develop some concepts which will enable us to contribute to the emergence of a stable order."<sup>62</sup> For the United States, global stability does not equate necessarily with maintaining the status quo, but rather the preservation of an environment in which U.S. interests are secure. Stability can not imply the complete absence of violence, revolution, or aggression, nor does it imply supporting every existing government or opposing every resurrection. Instead "the task of international politics is not to inhibit change but to find means to permit change to proceed without repeatedly shaking the peace of the world."<sup>63</sup> This is the

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<sup>61</sup>Clark, J.J., Admiral, USN, Sea Power and Its Meaning, p.19, Franklin Watts, New York, 1966. Approximately 99% of the nation's needed resources travel by surface ship. There is at least one imported strategic material, for every letter of the alphabet.

<sup>62</sup>George, A. L. & Smoke, R., Deterrence in American Foreign Policy: Theory and Practice, p.611, Columbia University Press, 1974. Quote by Henry Kissinger in 1968.

<sup>63</sup>Kennan, G. F., Realities of American Foreign Policy, p.103, Princeton University Press, 1954.

meaning of current U.S. policy attempts to deter regional hegemons and counter the proliferation of weapons of mass destruction.

Complicating this goal is the uncertainty of the future structure and distribution of power within the international system. One such uncertainty concerns the increasing number of "players" in the system. Each nation state and at times sub-national groups have their own unique interests, within the "new world order" (NWO), and each seeks to not only to protect but to enhance these interests.

One troubling dimension of the NWO are the growing asymmetries between the industrialized world and the Lesser Developed Countries (LDCs). Many LDCs have begun to claim that the existing patterns of wealth and resource distribution are a major reason for their inadequate standard of living. This discontent is breeding contempt for the status quo. Then Secretary of State John Foster Dulles commented on this nearly 40 years ago:

No wealthy individual can live happily in a community of poverty to which he is indifferent. It is the same with the society of nations... That is a law of social life and we cannot violate it except at our peril.<sup>64</sup>

The so called third world has become the major source of instability and violence in the international system.<sup>65</sup> Although most of the 35 ongoing (1994) sieges and civil wars throughout the globe, are of a peripheral concern to the United States,

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<sup>64</sup>Dulles, J.F., Secretary of State, January 17, 1955, Address before the American Bar Association at Philadelphia, p.174, Department of State Bulletin, January 31, 1955.

<sup>65</sup>Snow, D., Distant Thunder, Third World Conflict and the New International Order, p.1, St. Martin's Press, 1993.

in terms of "hard" interests, they can have a seriously debilitating impact on global stability. Religious or ethnic rivalries frequently transcend political frontiers. If these are the wars of the future, then the both the developed and the developing world devote adequate resources to meet the challenges.

The third goal is to continue supporting the United Nations (UN), not because of any utopic vision, but because of its legitimacy and offer of hope for many publics in Europe, East Asia, and the third world. Events in Bosnia and Somalia highlight the challenge in meeting this goal, as many of the crisis are of a different character than the original UN charter was envisioned to address. Multi-lateral solutions are understandably more complicated, but the United States is the only nation capable of providing the leadership to overcome some of the present hurdles. Leadership has its benefits, but also has a price.

Many of the dilemmas the world faces today are not novel. For example, even though President Roosevelt condemned the atrocities committed during World War II, claiming that "no right minded man" could "witness such occurrences without craving the power to prevent them," he also recognized that U.S. involvement "short of rightful and potential intervention" would accomplish nothing and possibly do more harm.<sup>66</sup>

As a world leader, the United States is frequently called upon to assist the UN in overcoming its structural, procedural, and financial shortcomings. Lest we

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<sup>66</sup>Thomas, D. Y., One Hundred Years of The Monroe Doctrine 1823-1923, p. 127, Macmillan Co, 1923. When the Senate rejected the League of Nations covenant.

forget, only half a century ago, some Europeans felt that the United States was an "observer whose presence was not always welcome, because we represented a nation ready with advice, but equally ready to shun responsibility."<sup>67</sup>

This goal requires policies which are at times broader than America's own immediate interests, while remaining within our capability. The United States can not secure its security in isolation, and future security will continue to be achieved through cooperation with others. This requires world perspective, and a desire to contribute to the security and prosperity of other nations.

## B. WORLD LEADERSHIP

America's role in the post-Cold War is a subject of hot debate. The idea of isolationism pervaded the Constitutional Convention of 1787, as Washington, John Adams, and a host of others warned against permanent alliances and espoused policies of non-interference.

Our own revolution and independence had gained the freedom of action, and by exploiting our isolation, the nation could pursue a different course, while avoiding entanglements in the balance of European power and politics.<sup>68</sup> But even then, isolationism did not mean a complete withdrawal from world affairs, but as Thomas Paine claimed "maintaining a maximum amount of freedom of action to protect American interests."<sup>69</sup> Washington's farewell address warned Americans against

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<sup>67</sup>IBID, p.465.

<sup>68</sup>IBID, pp. 2-5.

<sup>69</sup>LaFeber, p. xx.

tying themselves to the fortunes of any "foreign influence," again emphasizing the need for American freedom of action<sup>70</sup> Finally, on December 2, 1823 the nation announced the Monroe Doctrine of noncolonization and non-intervention in the Western hemisphere.

Isolationism may make good sense if economic or security welfare does not dictate otherwise. Such is the case today, as American interests are so intertwined and interdependent with other nations abroad, that engagement with the rest of the world, and world politics has become essential. What is necessary, is to identify those conflicts that affect U.S. interests; and match them against the country's international obligations. World leadership demands interests that transcend national boundaries, an idea whose time is still evolving. "Drift and evasion have the disadvantage of leaving the country subject to entanglement without the compensating advantage of providing opportunity to exert control on the world politics in which we become entangled."<sup>71</sup>

### **C. TRANSLATING GOALS INTO OBJECTIVES:**

Naval presence is one instrument by which the United States can demonstrate its commitment in relation to national interests and obligations as a world leader. Presence requires priorities amongst goals, as each region and / or crisis poses peculiar threats, challenges, and volatilities. This is difficult, since "geographical location and the international situation make it literally impossible to find the definite

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<sup>70</sup>IBID, p.48.

<sup>71</sup>Peffer, N., America's Place in the World, Viking Press, New York, 1945. p.76.

answers for such questions as: who will be our enemy in the next war; in what theater of operations will it be fought; and what will be our national objective at the time?"<sup>72</sup>

To shape or influence the international environment, the nation must look at the area(s) in question, and determine what it hopes to accomplish. TABLE 6 points out several defense related objectives for present planning:<sup>73</sup>

(TABLE 6)  
REGIONAL BREAKDOWN OF HIGHER LEVEL DEFENSE  
PLANNING OBJECTIVES

	East Asia	Europe	Middle East	Elsewhere
Environment shaping (long term)	Creating conditions where no single power is seen as military hegemon  Making arms races unnecessary  Encouraging orderly change	Creating conditions where no single power is seen as military hegemon  Making arms races unnecessary  Encouraging orderly change	Demonstrating that access to resources is vital U.S. interest  Demonstrating that U.S. and Arab security interests are not irreconcilable	Precluding rise of major military power  Improving security climate  Protecting U.S. citizens, property
Deterring threats (near and midterm)	Korea, sea lanes of communication, residual CIS	Residual CIS	Iraq, Iran, Libya, sea lanes of communication	Drug traffic, counter subversion, counter terrorism
Responding to contingencies (near term)	Korea	Residual Europe, Libya	Aggression in Gulf, against Israel, U.S. citizens	

SOURCE: Davis, P.K., Finch, L., Defense Planning for the Post-Cold War Era

<sup>72</sup>Pickering, p.102, Quote by George Marshal in 1938.

<sup>73</sup>Davis, P.K., Finch, L., Defense Planning for the Post-Cold War Era, p.19, RAND, National Defense Research Institute, 1993. Authors mention that this is a continuing theme of RAND work.

Some of these interests are perhaps perishable, but several are expected to remain relevant well into the 21st century. Of these interests, forward deployed naval forces are expected to contribute in the following areas: counter-proliferation; minimizing economic dangers (danger to imported oil, sea lanes of communication (SLOC) closure, and instability); humanitarian assistance; deterrence; regional stability; interoperability with allies; and crisis response. It must be recognized, as to be pointed out in Chapter V, that given the nature of many low intensity conflicts (LICs), the application or the threat of military force may not provide conventional solutions.

This thesis makes no claims as to which geographic areas are expected to be more important than others in the next century. But it can be assumed that because South West Asia will continue to hold over two-thirds of the worlds known oil reserves, and Latin America is of such close proximity, that these two regions will mandate our paying attention to any political or economic instabilities there. Regarding Europe, the socio-economic upheavals in Africa, or the continuing shift of economic and military power towards the Pacific Rim, one must acknowledge the objectives pointed out in Table 6.

TABLE 7 summarizes the 1994 forward presence mission statements of the different CINCs.<sup>74</sup>

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<sup>74</sup>Cook Conference presentation by OPNAV N513, Newport RI, 15-17 March 1994.

TABLE 7 - CINC FORWARD PRESENCE DEFINING OBJECTIVES:

MILITARY OBJECTIVE	EUCOM	USACOM	CENTCOM	PACOM	CORVETTE UTILITY
Timely crisis response	X		X		yes
Credible U.S. Naval Force	X		X	X	yes
Deter / Defend against state sponsored terrorism	X				yes
Secure LOCs	X	X	X	X	yes
Mil-Mil interop/ coop	X	X	X	X	yes
Mil-civil relations		X			yes
Extract endangered U.S. citizens	X			X	
yes					
Enforce no fly zones	X				no
Provide BMD for allies	X		X	X	no*
Detect / Monitor drug traffic		X			yes
S.A. Interoperability ???		X			?
Surveil / monitor strategic forces	X			X	no
Protect Shipping			X		yes
Defend South Korea				X	yes

Source: Cook Conference, N-513, Newport RI, 15-17 March 1994.

Although these objectives apply as seen in 1994, most are considered to be of fundamental value and of enduring interest to the nation. It appears that corvette flotillas are especially well suited for several of the above listed missions (timely crisis response, secure LOCs, military-military / civil interaction, and protect shipping), and could at least contribute to the majority of the other missions in one AOR or another. Chapter V will explore if the flotilla is adequate to meet specific requirements, looking for both the desirability (effectiveness of benefits) and feasibility (practicality).

In conclusion, the United States has many instruments for pursuing objectives abroad, for example, trade, diplomacy, alliances, arms transfers, and military exchanges. Although "our influence will increasingly be defined more by the quality of our ideas, values, and leadership, and by our competitiveness in the international market place, than by the predominance of our military capabilities,"<sup>75</sup> a robust American capability remains in the national interest.

These issues touch on the nature of forward military operations, as the Nation must ask how far forward, and whether the presence stabilizes or escalates a crisis or arms build-up. Corvette flotillas can not satisfy all of the requirements expected of forward deployed naval units, but they offer an option worthy of consideration. They balance several goals which seem important to the Nation as a whole without sacrificing American commitment as a world leader.

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<sup>75</sup>National Security Strategy, p.5.

## V. UNITED STATES NAVAL MISSIONS AND OPERATIONS IN 2010

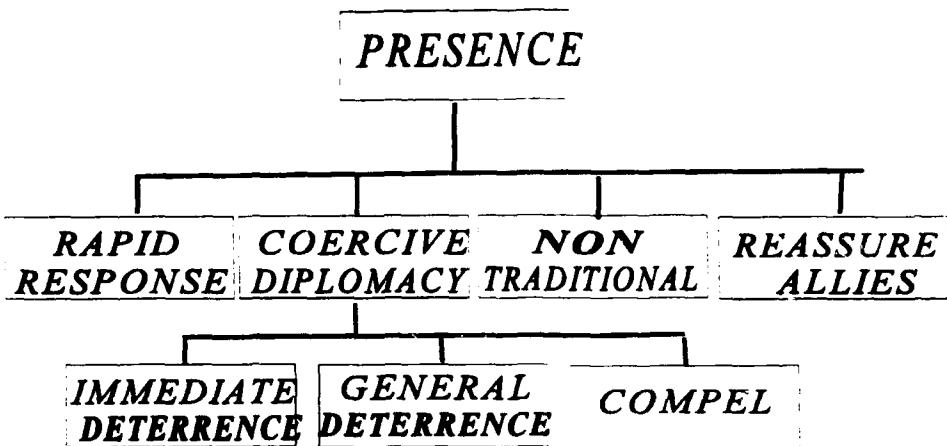
"'Command of the sea' in peacetime lies, like beauty, in the eye of the beholder, and in future it will not be easy to behold." - Sir Julian Corbett

"From the Sea" highlights the centrality of controlling events ashore.<sup>76</sup> This is a radical change from the last 50 years, when the naval force concentrated primarily on dominating the open ocean conflict with the Soviets. This shift in direction requires fundamental reassessments, to clear and keep the path open for force sustainment ashore. This means coping with closer horizons amidst highly contested littoral shores. Naval forces must remain flexible, capable, and self sufficient, and when the situation dictates, contribute synergistically to a joint / coalition effort.

It must be remembered that presence, to be effective, requires keeping and exploiting the initiative, which requires a mix of ships designed for a myriad of missions. Corvette presence and rapid response capabilities exploit this initiative, reassure allies of the United State's commitment, and contribute towards general deterrence. The flotilla is also available to perform a host of non-traditional missions which are rising in eminence. The risks are obvious, as navies often operate in "harm's way," and capability is required even in so called "low threat" areas. Figure 2 highlights the framework from which the missions and operations of presence is envisioned:

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<sup>76</sup>Department of the Navy, "From the Sea, Preparing The Naval Service For the 21st Century," p.1, September 1992.



**FIGURE 2: ESSENCE OF PRESENCE**

**A. THE LITTORAL "ENVIRONMENT"**

Although no nation is capable of challenging American interests on the high seas today, this is not so in local waters. The diffusion of technology with naval application is widespread given the increase in offset arrangements (co-production, subcontracting, and / or licensing), and the growing internationalization of military production.<sup>77</sup> This proliferation will complicate American foreign policy, as the weapon recipients become more self confident and difficult to influence. "For the first time in the post World War period, recipient states can acquire enough military capability to deter, directly threaten, and influence the behavior of states in the system."<sup>78</sup>

<sup>77</sup>Krause, K., Arms and the State: Patterns of Military Production and Trade, p.108, Cambridge University Press, 1992 and Laurance, pp. 9 and 132.

<sup>78</sup>Laurance, p.158.

As several hardware trends indicate, several nations are raising the risk and cost for any external military forces attempting to wield influence in their waters. Layered multi-dimensional defenses may increasingly be encountered near the offshore approaches to landing areas, strategic ports, straits, or choke points. Examples include new air independent diesel electric submarines (AIP), submerged launched and/or advanced sea-skimming cruise missiles, sophisticated "smart mines," land-based tactical aircraft, ballistic missiles, and, in the future, space. Add the complicated geography of many coastlines and the density of merchant shipping inshore, and it is clear that warfare in coastal waters will likely prove a challenging task.

An increasing number of nations are expressing and even demonstrating their desire to acquire more weapons, sensors, and countermeasures, commensurate with their security concerns. Although the total force levels have not changed very much, there are definite signs of qualitative modernization.<sup>79</sup> This trend towards less quantity and more quality is a definite sign that several nations intend to raise the stakes for external powers operating in their local waters. This adds to the challenge of presence in the littorals.

Depending on one's endowments, most coastal nations recognize the significance of space based surveillance, navigation, and communication as either an opportunity or a liability. This is perhaps best demonstrated by the fact that despite limited resources, several developing countries are investing heavily in maritime

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<sup>79</sup>Preston, A., "The Naval Balance," p.8, Naval Forces, no II, vol XIV, 1993.

surveillance and/or patrol equipment, recognizing the advantages and need for real time surveillance / targeting.<sup>80</sup> Although very few nations have adequate space based capabilities today, various sources are available (ie: French SPOT) if the recipient is willing to pay for the information. As more coastal states acquire surveillance capabilities, their tactical intent becomes increasingly ambiguous.

All of these factors complicate presence in the littorals, necessitating a combatant specifically designed to meet the demands of the environment.

#### **B. RAPID RESPONSE**

The Navy shall be organized, trained, and equipped primarily for prompt and sustained combat incident to operations at sea. It is responsible for the preparation of naval forces necessary for the effective prosecution of war except as otherwise assigned and is generally responsible for naval reconnaissance, antisubmarine warfare, and the protection of shipping.<sup>81</sup>

This section points out how corvettes may be compact vessels, but are more than "presence on the cheap." They offer a complementary and necessary inshore component to the fleet, and are able to conduct or contribute to every rapid response mission. When one recognizes that six corvettes can be maintained forward for one DDG, or more than 60 for a carrier operating alone, one grasps the flexibility for tailored presence offered by corvettes. This flexibility can contribute not only to

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<sup>80</sup> Naval Forces, no. VI, vol XIV, 1993, "Submarines for the Third World" & "The Justification For Naval Forces." p.16. Examples include: Belize, Cyprus, Guyana, Jamaica, Seychelles, Marshall Islands, Papua New Guinea, Gabon, Mauritania.

<sup>81</sup> Department of Defense, "Functions of the Department of Defense and Its Major Components," p.9, DOD Directive 5100.1,1969, article 10.

constructive multi-national coalitions, but also complicates the decision process for a potential adversary.

Figure 3 portrays the two major rapid response mission areas to be discussed: blockade and battle space management.

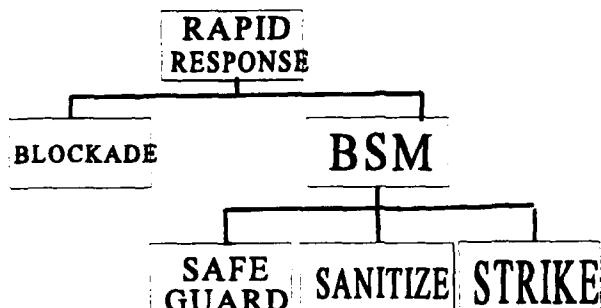


FIGURE 3: RAPID RESPONSE MISSIONS

### 1. Blockade / Embargo

During the War of 1812 the Royal Navy maintained a tedious yet persistent blockade off every American port with squadrons of three or four frigates strengthened by a ship of the line or two.<sup>82</sup> By May 30, 1814, the blockade held the whole American East coast in its grip from New Brunswick to Florida.

The imposition of naval embargoes and blockades is a centuries old measure aimed to influence another nation. Historically, a naval blockade was designed to not only keep goods and resources from entering the enemy country, but also to neutralize the opponent's fighting fleet. In the end, as Sir Basil Liddel Hart described, blockades aim to induce "helplessness which induces hopelessness, and

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<sup>82</sup> Albion, R.G., and Pope, J. B., Sea Lanes in Wartime, The American Experience 1775-1942, W.W. Norton and Co, 1942. p.118.

history attests that loss of hope and not loss of lives is what decides the issue of war."<sup>83</sup>

Several studies point out the time and resources required to enforce a blockade.<sup>84</sup> Air transportation and contiguous land boundaries have complicated the efficacy of maritime blockades, and the blockade itself often disproportionately distributes the level of hardship. Yet, the mission seems to be receiving renewed emphasis. As of early 1994, three blockades were in effect, (Iraq, former Yugoslavia, and Haiti).

The London Conference of 1909 established several blockading principles, one being that the blockade must be enforced with adequate forces, vice simply being declared. If the international community is to continue to view blockades as a viable option, then several issues must be addressed, namely level of risk, potential cost, and acceptable duration.

Blockades can no longer be necessarily considered low risk. As Appendix I points out, numerous coastal countries possess or are acquiring land and/or naval forces to make blockade enforcement riskier. This may require blockades at extended distances, which equates to larger areas, and hence more enforcing platforms.

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<sup>83</sup>Uhlig, F., Vietnam: The Naval Story, p.6, Naval Institute Press, 1986.

<sup>84</sup>Elliott, K., Hufbauer, G., Schott, J., "Sanctions Work: The Historical Record," pp. 255-259, in M.L. Sifry and C. Cerf (eds.), The Gulf War Reader, Random House, 1991. For example the authors point out that on average, two years were required in the 35% of cases where sanctions were considered successful since 1914.

Corvettes are superior platforms for blockading. A flotilla can be deployed in such a manner as to minimize any local threats facing the blockading force, and the flotilla provides the numbers of vessels necessary, especially at extended distances from the shore. Not only do corvettes perform this mission at a fraction of the cost of an expensive Aegis combatant, but they present numerous response capabilities should the situation dictate. Of course, the success of the blockade remains contingent on the degree of seaborne trade the nation against which the blockade is imposed relies.

a. **Vietnam - Operation MARKET TIME**

The naval interdiction campaign off the coast of Vietnam is an example of just how long, expensive, and arduous blockading can be. It must be remembered that this blockade was an anomaly, in that there was no maritime threat to the naval ships which moved relatively risk free.

The length of Vietnam's coastline is over 1,000 miles. On any given day, thousands of junks, sampans, and trawlers traversed the offshore and inland waterways, plying their wares of fish, commercial cargo, and, of course, vast quantities of war fighting materials for the Viet Cong.<sup>85</sup> The need to interdict these supplies became obvious in 1963; the response, "Operation MARKET TIME," established patrol areas 30-40 miles deep, 80-100 miles long, off the Vietnam coast.<sup>86</sup>

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<sup>85</sup>Uhlig, Vietnam: The Naval Story, p.311. Estimates claim traffic of 50,000 vessels a year, and that somewhere between 70-97% of the war material arrived by sea.

<sup>86</sup>IBID, p.281. The Bucklew Report (January 1964), acknowledged the need and value of a maritime blockade, but remained critical that the success of any sea patrol was contingent on an accompanying effort to block inland infiltration routes.

USS Higbee (DD 806), and Black (DD 666) were the first ships assigned to Market Time ( March 1965). Within a month, the operation was expanded to include 28 naval ships.<sup>87</sup> Even 28 ships proved too few in number for the area of coverage, and their deep draft often impeded operability in several key southern areas. The solution was the addition of several 50 foot Swift boats, PCFs (Patrol Craft Fast), and 82 foot Coast Guard cutters.<sup>88</sup>

Until this time, no naval vessel of less than 210 feet had been underway more than 35% of the time during the year. Nine Coast Guard cutters, with 11 rotating crews, were deployed and underway two thirds of the time. Although mother ships provided fuel and food, the ships became the backbone of the surveillance force. exploiting their versatility and their minimal need for logistical support.

If the nation could call these ships up on such short notice, and against such odds, why not wait again until the contingency of the future drives us to such action? For one, consider the number of cutters available in 1965, and those projected in 2010, when the Coast Guard faces block obsolescence of its cutter fleet.<sup>89</sup>

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Nonetheless, South Vietnamese patrols reportedly searched 135,911 junks, and in 1964 the number increased to 211,121.

<sup>87</sup>IBID, p.283.

<sup>88</sup> Schreadley, From the Rivers To The Sea: The United States Navy in Vietnam, p.86, Annapolis MD, Naval Institute Press, 1992. The DDs were eventually pulled out.

<sup>89</sup>Stubbs, B.B., Cdr., USCG, "The Need for Coast Guard Cutters in the 21st Century," An unpublished paper for force planning, National Security Decision Making Course, Naval Warfare College, 26 October 1990.

Then consider the increasing number of non-traditional missions off the shores of the United States, one example being the Chinese and Haitian immigrants which are arriving almost routinely by sea. The cutters which are enforcing domestic laws and issues, would have to be pulled off station with great reluctance and penalty. Resources being tight, and force levels getting smaller, the corvette presents a complementary alternative.

**b.      Haiti embargo, 1993**

The late 1993 - 1994 quarantine off the coast of Port Au Prince Haiti, is of a smaller scale, and could be described as a "peripheral issue." Yet, an international flotilla sits offshore, including ships of the United States (3 guided missile cruisers [CG], 1 Destroyer [DD], & 2 frigates [FF]), Canadian, French, British, and Dutch navies.

The area of coverage is relatively small, and Haiti enjoys an unenforced 241 mile common land border with the Dominican Republic. The embargo has turned into a waiting game, with the Haitians betting that the West will lose interest, and eventually renegotiate the terms of President Aristide's return. Like its predecessor off the same shoreline in 1963 (against the regime of Papa Doc), the operation exemplifies the costliness and open-ended duration of a sea-going blockade.

This embargo is pertinent to the subject at hand for two reasons. First, it ties up significant assets (six ships from the United States alone) and resources, which affects other operations and maintenance priorities. Second, the

Haitian embargo points out the incompatibility and excess of firepower of the present ships assigned to the task. If a blockade is deemed to be in the national interest, corvettes can perform the mission at a fraction of the cost of those on station today.

**c. North Korea contingency**

For a hypothetical example of a potential blockade in a less benign environment, consider the possibility of sanctions and a subsequent blockade being imposed against North Korea. Unclassified reference materials abound regarding North Korean orders of battle and weapon purchases or exports, and although the navy is not North Korea's largest military branch, it does reflect a sizeable investment: From 15 different bases, the following type units operate:

- 21 Romeo and four Whiskey class diesel electric submarines, both able to carry torpedoes or mines. Additionally over 50 midget submarines are reported operational.
- Three old STYX firing frigates, 387 Patrol and coastal combatants, three big gun corvettes, 45 STYX armed missile craft, 173 torpedo craft.
- two SILKWORM regiments at six sites
- 240 SA-2 Surface to Air missile (SAM) sites, 36 SA-3, 24 SA-5. <sup>40</sup>

As can be seen, this force may not be state of the art, but it is designed for extensive layered defenses in support of a sea denial role. Aside from the forces mentioned above, tactical air craft, mobile ballistic missile batteries, and, of course, mines, should be expected to be part of any North Korean battle plan. Also

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<sup>40</sup>The Military Balance 1993-1994, Brassey's For the International Institute for Strategic Studies (IISS), London, 1993.

consider how many vessels would be required to patrol the 2,495 km North Korean coastline.

A blockade requires not only adequate numbers of ships, but also ships able to protect themselves. It is unclear how many and of what configurations, the CINC would receive for a hypothetical North Korean contingency (MRC), but given past record, North Korea would be expected to be truculent at best. It is unlikely that there would be a six month grace period to build up forces.

**d. Visit, board, search, inspection (VBSI)**

United States merchant vessels were interdicted during the 19th century, as they reluctantly tolerated the visit and search by British warships, supporting the abolition of slavery.<sup>91</sup>

This mission is commonly, but not always, performed in support of a maritime blockade. From the time sanctions were imposed against Iraq until the ceasefire (March 3, 1991), 7,645 ships were intercepted, of which 960 were boarded.<sup>92</sup>

Whether enforcing UN resolutions in the Adriatic or conducting drug interdiction operations, it is clear that corvettes can perform the mission at a fraction of the cost presently being incurred.

There are plenty of coastlines around the world where blockades may be considered, and as can be seen from TABLE 8, these coastlines could require

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<sup>91</sup>Hagan, K. J., American Gunboat Diplomacy and the Old Navy 1877-1889, p.96, Greenwood Press, 1973.

<sup>92</sup>Gimblett, R., Lieutenant (N), Multinational Naval Operations: The Canadian Navy in the Persian Gulf 1990-1991," pp. 25-31, Canadian Defence Quarterly, August 1992.

several ships, often as part of a multi-national effort. As demonstrated in the past, small ships in adequate numbers are required to effectively perform the mission.

TABLE 8: COASTLINES

COUNTRY	COAST	# of PORTS	RISK
Iran	3,180 (km)	6	high
Iraq	58	3	low
Libya	1,170	6	low
N. Korea	2,495	6	high
Haiti	1,771	2	low
Liberia	579	1	low

## 2. Battle space management

We need some warships "whose mission is to sink, burn, and destroy,'... a duty nobler in every sense of the word and one that more exactly fulfills the ideal for every true hearted sailor.<sup>93</sup>

Should sanctions prove inadequate, it may be necessary to step up the pressure. "Operating forward buys reaction time, as the force sets out to dominate what "From the Sea" calls the "expanding and contracting battlespace."<sup>94</sup> Local battlespace control includes the fleet's "sea, air, and land environments." The extent of the battlespace to be controlled depends largely on the range of the enemies weapons. This battlespace is three dimensional (up, out, down), and is described in the Bottom up Review as:

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<sup>93</sup>Hagan, p.50. Quote by Lt J.C. Soley in the late 19th Century, claiming that "to look upon our navy as commerce destroyers is making a grave mistake."

<sup>94</sup>"From the Sea," p.5.

1. The area from the open ocean to the shore which must be controlled to support operations ashore.
2. The area inland from shore that can be supported and defended directly from the sea.

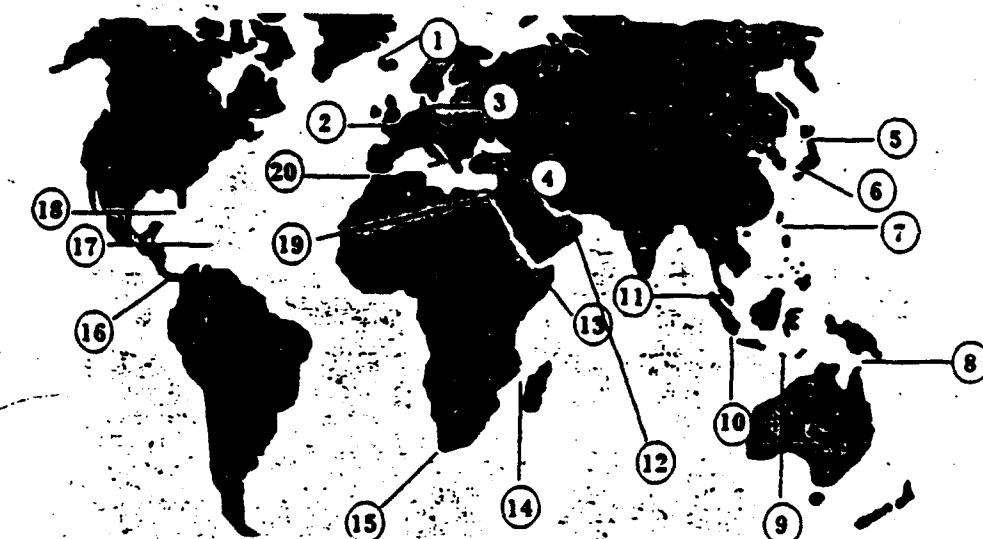
This section describes how a corvette flotilla can contribute to battle space management requirements. With superior assimilating, correlating, and relaying of scouting information, corvettes give the lie to the claim that smaller equates to incapable.

**a. Sanitize area**

When diplomacy breaks down and war threatens, the navy is tasked to establish sea control in the area(s) of interest for the purpose of mounting offensive operations and to ensure the flow of men and material. The mission emphasizes the "any time any place" credo associated with naval forward deployed forces.

Consider the littoral regions that may need to be sanitized; the offshore approaches to a landing area, strategic port, strait, or choke point come readily to mind see (Figure 4). In order to be successful, the force must be prepared to destroy the gamut of options available to an adversary, eventually close to his shores. Moving men and material across the ocean is noteworthy but proves faint unless the last few miles can be controlled. Forward deployed corvettes can offer a host of options to deal with the various threats.

## Maritime chokepoints



1. Denmark Straits
2. English Channel
3. Skagerrak
4. Bosphorus
5. La Perouse Strait
6. Tsushima Strait
7. Luzon Strait
8. Torres Strait
9. Lombok Strait
10. Sunda Strait

11. Straits of Malacca
12. Strait of Hormuz
13. Bab al Mandab
14. Madagascar Channel
15. Cape of Good Hope
16. Panama Canal
17. Mona Passage
18. Straits of Florida
19. Suez Canal
20. Strait of Gibraltar

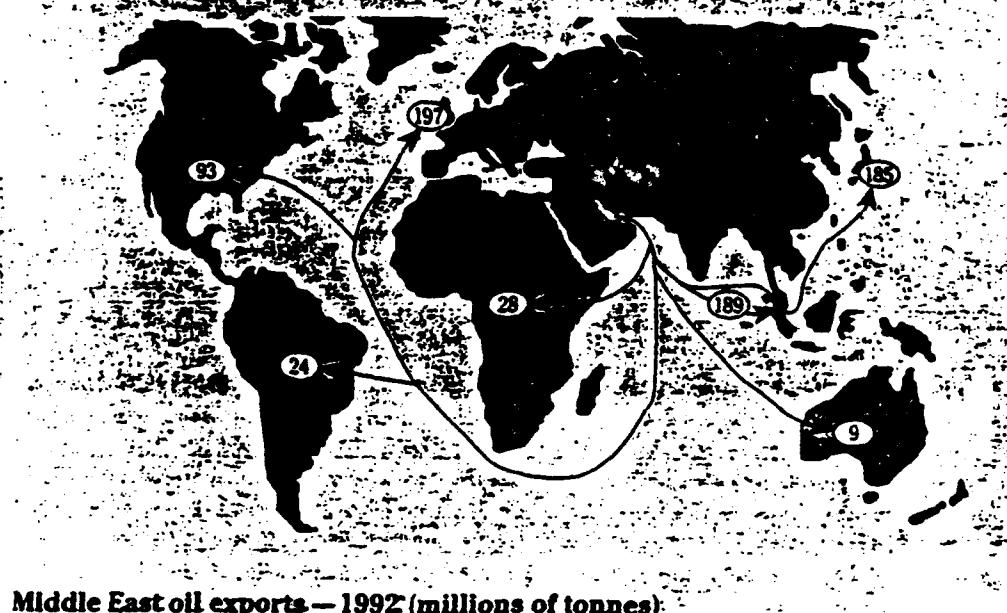


FIGURE 4: MARITIME CHOKEPONTS AND OIL FLOW PATTERNS  
SOURCE: International Defense Review, August 1993, p.614.

Two warfare areas that are critical in many littoral operations are air superiority and naval gunfire support (NGFS). The contribution of the corvette is considered minimal in both areas. When a formidable air threat is possible, then external anti-air assets, from either an Aegis or the CVBG are required. This forces the question, whether corvettes will drive an adversary to build up air forces to overcome a relative weakness? Invariably opponents try to exploit another's weakness, but since the flotilla is part of a larger force when required, the impact should prove not as critical. It must be remembered, each corvette possesses formidable soft and hard kill anti-air systems, but they are for point defense, not air supremacy.

The second shortcoming deals with using the less than optimal 76 mm gun for NGFS. Experiments are being conducted with vertical-launched fire support missiles, but considering the limited package, corvettes are not ideally suited for this capability. But besides onboard ordnance, the corvette can shuttle various air assault packages (latest equivalent of UAVs, and SH-60s with a variety of cannons, missiles, and various countermeasure payloads. This aspect or the landing of assets launched from other units could prove invaluable.

**b. Strike**

This is where coercion takes on the violent aspect of diplomacy. Strike implies touching targets onshore as well as off, in support of the "contracting and expanding battle space." It is the projecting of naval power inland or at sea, against the enemies points of vulnerability or menace. Among strike assets available

(attack manned aircraft, amphibious landing, precision unmanned munitions) the Tomahawk (TLAM) land or sea attack cruise missile is expected to play a larger role in keeping the enemy off balance. Myers points out the potential of the TLAM, which is able to strike various targets at a reduced cost and less of the political burden associated with air crews.<sup>95</sup>

Whether concentrating on sanitizing the AOR or striking the enemies point(s) of vulnerability, future operations require ships designed to operate in high risk areas. There is a need to augment the present forces with less expensive ships, in adequate numbers, physically dispersed, yet capable of concentrating their aggregate firepower. This requires ships designed for specific missions that can expand the depth of the force.

A flotilla of TLAM carrying corvettes operating in a dispersed formation with a concentrated fire capability provides the force with greater standoff range and combat radius than most adversaries. Although Tomahawk performs well against large targets, they are ill-suited for many smaller targets, which like NGFS, may warrant the airborne assault packages launched from a variety of dispersed flight decks. Clearly some targets do not warrant a TLAM attack.

Nonetheless, the importance of the TLAM importance is increasing as well as its performance, especially with the decreasing numbers of carriers and long range attack air craft, and the increasing number of surface

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<sup>95</sup>Myers, Charles E.; Naval Institute Press; "Time to Foid 'em;" July 1991.

combatants with vertical launch capability. The range of the conventional land attack version exceeds 700 nm, which is comparable to that of an unrefueled A-6.

Corvettes allow the Nation to take full advantage of its naval superiority. The dispersal of a well armed TLAM corvette flotilla during a strike mission, greatly complicates the opponent's targeting, increasing the probability that some will survive any massed attack. This should discourage a preemptive strike by an opponent, since not only is it incrementally harder to get that one debilitating blow, but recourse could be expected to follow.

### **C. Safeguard sea-borne trade and reinforcements**

In 1893, an uprising threatened the friendly Brazilian government. Although President Cleveland hoped to remain neutral, several United States exporters, including Standard Oil, warned that their trade was endangered. The president responded by ordering Naval units to enter the Brazilian ports, with orders to protect the United States shippers that wanted to unload their goods in the Brazilian ports.<sup>96</sup>

For years, the traditional mission of navies worldwide was to protect seaborne trade and cultivating foreign markets. Although economic trade and volume patterns have changed dramatically, the United States is more reliant than ever before on foreign markets, resources, and sources of energy. In the next century, this movement of cargo, which forward presence influences, will continue to rely on the seas.

Although the West often took for granted the maritime flow of traffic during the Cold War, the period was far from risk free. For example, during

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<sup>96</sup>LaFeber, pp.165/166.

the Iran / Iraq war, over 400 vessels were attacked by both belligerents.<sup>97</sup> Operation "Preying Mantis" and "Earnest Will" involved the escorting of reflagged Kuwaiti oil tankers during the Iran/Iraq war. The oil tankers were picked up as they transited the Strait of Hormuz, and escorted throughout the transit to Kuwait.

Another area that will in all likelihood be revisited, is the landing and support of troops ashore in some hostile land. As Colin Gray put it: "Seapower is about the use of maritime lines of communication for the effective interconnection, organization, and purposeful application of the warmaking potential of many lands. Seapower is about the transfer of the power of the production base on land at times and to places of strategic choice."<sup>98</sup> The transfer of this power requires the unimpeded flow of goods across the oceanic sea lanes. Ensuring this transport of men and material across the oceans has always been a critical determinant in extended warfare, as the timely arrival of supplies can spell the difference between success and failure.

As mentioned earlier, the mission does not stop with the landing itself, as the troops must be supported, perhaps for months on end. Several potential aggressors are acquiring the capability to harass and hinder shipping, at least in

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<sup>97</sup>Russo, F.V, "Neutrality at Sea in Transition; State Practice in the Gulf War as Emerging International Customary Law;" p.1, Naval War College Review, 25 May 1988. No maritime nation was immune from the attacks, as vessels from over 30 neutral countries were attacked, which included all five permanent members of the UN Security Council.

<sup>98</sup>Gray, C. S., and Barnett, R. W., Seapower and Strategy, p.21-23, Naval Institute Press, Annapolis, MD, 1989.

their local waters. This affects the nation as we must re-learn how to escort with limited assets available. During this time, the inshore forces surrender tremendous tactical advantage, in that their movements are predictably within a given area of operations.

It is postulated that corvettes can assist with ensuring that the 25 afloat pre-positioned ships (APF) are able to deploy from their various forward ports, and that these ships and any others are able to land when and where desired. This is not to suggest that the U.S. must prepare for another "blue water" convoy campaign, but that potential opponents, 15 years from now, are likely to have at least minimal capability to disrupt shipping crucial to the campaign. Figure 5 depicts the concept of how the corvettes are envisioned to escort and protect high value military task forces and convoys.

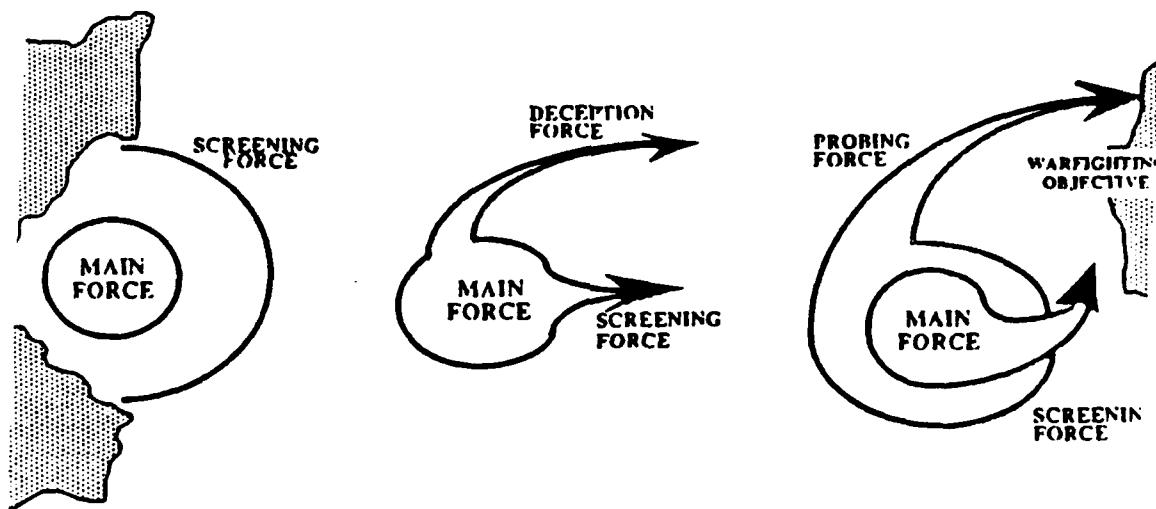


FIGURE 5: CORVETTE "POINT" ESCORTS  
Source: Meyer, p.82.

Attacking the enemies commerce, or "guerre de course," has never been decisive in past wars, but there is no doubt as to the effectiveness and uncertainty of both World Wars caused by German U-boats. Technology has improved the potential of and consider that container ships carry significantly more cargo today, such that the loss of even one ship could prove catastrophic to the campaign. During World War II, cargoes were interspersed among various ships to preclude such disaster, but what is important, is that it may be easier and more attractive for a weaker power to strike at an artery vice the heart.

The Korean and Vietnam Wars, and Desert Storm were anomalies in that there was no significant threat to the maritime re-supply. Considering that over 95% of the war material typically moves by sea and assuming a pragmatic opponent, this lifeline may not go unchallenged in the next crisis. Commercial satellite information and predicted routes and speeds of advance, give 'guerre de course' an aura of relevance. Why rest solely on sea denial, if battle is eminent?

Since corvettes are forward deployed for one reason, which is to operate in littoral waters even at the risk of losing some of them. If corvettes are to be considered, the local threat must be first assessed, and an appropriate force package assembled. Corvette flotillas could assist with the controlling, seizing, and denying, given a low threat AAW environment and the proper tactics. But corvettes do not perform all tasks, and as the risk level increases, they would require external air support from various space, naval, and joint assets.

Following the tremendous loss of shipping, during both World Wars, nations found they needed more destroyers to fight these type of inshore operations. Corvettes can protect the convoys during the trans-oceanic voyage and near the terminal points of ingress and egress, much as 1500 ton combatants that routinely accompanied and protected convoys across the Atlantic Ocean during World War II.

### C. COERCIVE DIPLOMACY

"A navy was not merely an agency for territorial defense, but also an instrument with which to compel respect for the other material interests and policies."<sup>99</sup>

Coercion or "violent diplomacy," has been described as exploiting one's capability to inflict pain. This involves communicating a threat, and then convincing the opponent, that "any pain inflicted will be commensurate on his behavior, and relief can be found only upon accommodation." Coercion, if successful, favorably channels your opponents motivations, vice striving to simply overcome his strength.<sup>100</sup>

Coercion has two complementary yet unique "faces:" deterrence and compellence. An understanding of this concept is necessary, as is recognition of those factors which have contributed to success (and failure) of each. Although there

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<sup>99</sup> Sprout, The Rise of American Naval Power, p.21. Quote by James Madison.

<sup>100</sup> Schelling, Thomas C., Arms and Influence, p.5, Yale University Press, 1966. Convincing your opponent that surrender or acquiescence are his best alternative as compared to persistence.

is no guarantee of future success, such an understanding does provide a stronger perspective in making decisions regarding national security.

### 1. Deterrence:

"The regular visits of a warship would have "an excellent moral effect" on the native populations."<sup>101</sup>

Deterrence has been called the primary and central motivating purpose underlying American military strategy. This fundamental objective for America's armed forces equates to being able to " deter aggression and, should deterrence fail, to defend the nation's vital interests against any potential foe."<sup>102</sup> Presence is a form of deterrence. Corvettes can contribute in a limited way.

Deterrence can be defined as the art of persuasion, or the convincing of an opponent, that the long (and short) term costs and / or risks, of a given course of action outweigh any benefits which can be expected. Although this concept is straightforward, the process is complex, the execution can be risky, and the outcome not always certain. The challenge is to influence without encountering resistance or prompting escalation leading to outright war.

Numerous studies have attempted to correlate objectives, determination, morale, perceptions, etc, with probabilities of deterrence failure/success. In most of these studies, "causal correlations proved inadequate, which is perhaps attributable to the dynamism of the intervening variables, which often can not be pre-defined with

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<sup>101</sup>Hagan, p.114. Commander Charles Huntington of the USS ALERT in Dec 1880.

<sup>102</sup>National Military Strategy, p.6.

coded values."<sup>103</sup> George and Smoke demonstrate how several other dimensions of deterrence, besides those associated with objectives or means, become more complex at the lower levels of threat. Nowhere is this more true than in today's political environment. Assessing causal relationships is difficult, because there is no sure way to calculate an opponent's cost/benefit calculus; when an opponent does refrain from certain actions, there are often no external signs to substantiate that deterrence has "worked."

When talking about deterrence, the United States specifically engages in what Huth refers to as "extended deterrence," which implies a nation's commitment to a third party (protege) against external aggression (See Figure 6). This extended deterrence takes on two dimensions based on the immediacy and probability of the threat. The first, "extended-immediate deterrence" refers to a "confrontation between adversaries in which the perception of armed conflict is highly probable unless one side backs down." The second, "general-extended deterrence," refers to political and military competition between a potential attacker and defender in which the possibility of an armed conflict over another state is present, but the potential attacker is neither actively considering the use of force nor engaging in a confrontation that threatens war." The defender allocates resources and deploys

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<sup>103</sup>George & Smoke, p.91. For example another deterrence study conducted nearly 30 years ago by Bruce Russett, claimed that the "critical success or failure factor," is the "credibility of the defender's commitment to the pawn." Examining 17 cases, where a major power attempted to deter an attack on a pawn, Russet found that only one factor, economic interdependence (% of the pawns imports provided by the defender), demonstrated a high degree of deterrence "success."

military forces for various contingencies of armed attack, even though there is no imminent threat of attack.<sup>104</sup> The first task is to determine if and how forward deployed corvettes might contribute to extended deterrence.

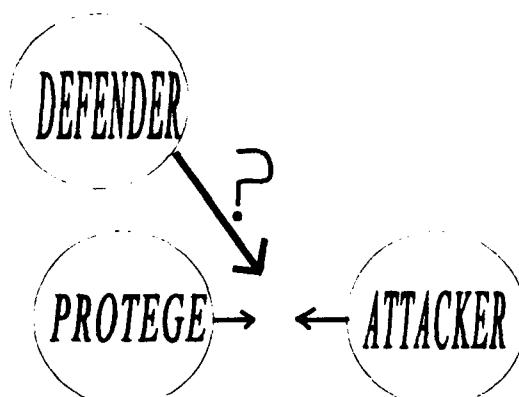


FIGURE 6: EXTENDED DETERRENCE

One of several variables that Huth tested was the local balance of military forces. He constructed three measures of this balance (immediate, short term, and long term) against three possible strategies the attacker might take (limited aims, rapid offensive attack, and war of attrition).<sup>105</sup>

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<sup>104</sup>Huth, P.K., Extended Deterrence and the Prevention of War, p.16-17, Yale University Press, 1988. Analyzed 58 historical cases of extended-immediate deterrence from 1885-1984 (34 occurred before WW-II, and 24 after the WW-II).

<sup>105</sup>IBID, 57-61. Immediate balance is defined as those forces of the attacker in position to attack, and those forces of the defender and protege in position to immediately repulse the attack. The short term balance is defined as the capacity of the attacker, defender, and protege to augment the immediate balance of forces by mobilizing peacetime reserves, measuring the potentially effective strength of both sides in the first few months. Long term is the capacity of all parties to build up existing forces by mobilizing the economy and civilian population for war.

In the limited aim attack, the attacker seeks a quick, low cost military victory, a fait accompli pulled off before the victim or defender can respond. In a rapid offensive strike, the time frame is measured in weeks or months, allowing mobilization of the attacker to augment the victim state attacked. Huth's analysis revealed that the immediate and short term balance of forces have significant effect on the probability of deterrence success.<sup>106</sup>

Would a flotilla of corvettes tilt the local balance of forces, reflecting capability to repulse an attack? Based on Huth's research, corvettes are not suitable for immediate-extended deterrence, though this would depend on the quality of the aggressor relative to the protege'. Corvettes could only be considered as an augmenting capability with a larger force. But it is hypothesized that the flotilla can contribute to general deterrence, when attack is not imminent.

Consider an adversary who contemplates attack. He performs the following calculation :  $P(C + R) > (1-P) B$ , where

P = probability of U.S. action in support of a 3rd party

C = cost to the aggressor to defend against the pawn & U.S. action

R = the risk (or penalty) to the aggressor, of action from the pawn and the U.S.

B = expected benefits to the aggressor

(1-P) = the probability of U.S. inaction, in support of a 3rd party<sup>107</sup>

This proposition highlights that the attacker's cost/benefit analysis is based upon on the probability (P) of the defender taking action. Of course much is context-driven, for example the relative strategic importance of the protege or region,

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<sup>106</sup>IBID, p.74.

<sup>107</sup>George & Smoke, p.60.

the distances involved, and the makeup and structure of U.S. military forces in the area (and in general). Since much rests on the fear of retribution, as pointed out earlier, the sword must be heavy enough.

Forward deployed flotillas reduce the transit time which equates to quicker response. As the "advantage in numbers" section pointed out, the adversaries decision making process is greatly complicated, as he no longer can concentrate on just a few platforms. Each corvette impacts the campaign in some way, raising the cost and risk for the adversary, and despite a reluctance to become militarily involved, should the stakes dictate, corvettes can go in and fight where the risk is high.

Again, the United States may be moving in a world where deterrence and compellence take on different meaning, complicating the decision of just how much and to what degree of presence is required. Corvettes are only an augmenting force, capable of limited action.

## 2. **Compellence:**

Compellence by contrast, takes a more proactive approach. Schelling points out that where deterrence says "if you cross this line I will..." and suppresses enemy action, compellence says "I will do 'X, to you unless you do 'Y,'" and requires the enemy to do something. Compellence retains the benefits of initiative and momentum, and forces the opponent to act, to avoid collision. Compellence can be intrusive, hostile, and provocative, and requires a minimal time period to wait. It has definite objectives, has a deadline, and treads a fine time line

in striving to keep the pressure on, while still providing the opponent time and an avenue to yield. Communication is crucial, as it limits some of the uncertainty.<sup>108</sup>

To understand how compellence can be expected to fare in general, it helps to assess its use during the Cold War, when the United States used military force hundreds of times "to underscore verbal and diplomatic expressions of American foreign policy."<sup>109</sup>

Examining the effectiveness of this military force as a political instrument, Blechman and Kaplan conducted a study that looked at the significance of variations in force strength, tactics, and other strategic stratagems. What their study revealed, is that armed force, by itself, is unable to sustain a large proportion of favorable outcomes over the longer term.<sup>110</sup>

A summary of the outcomes are noted: If the use of force was intended to assure or deter behavior, results indicated 90% short term success and 64% long term success. If the intent was to compel or induce behavior, the results were noticeably lower, with 59% success in the short term, and 19% in the long.<sup>111</sup>

Results indicated that even when "favorable" and desired outcomes were obtained in the short term (six months), the longer term (three years) consequences were not always apparent. Examples of some unforeseen

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<sup>108</sup>Schelling, p.72.

<sup>109</sup>Blechman and Kaplan, p.3.

<sup>110</sup>IBID, p.87.

<sup>111</sup> IBID, pp. 92-93.

consequences include the former adversary increasing the size and capability of his armed force, developing new weapon systems, and at times, a strengthening his resistance. In conclusion, military operations, at least during the Cold War, were not always permanent remedies for difficult international situations. At best, they gained time for other forms of diplomacy.<sup>112</sup>

### 3. Perceptions

"If we send only missionaries and whalers to seas where other nations send men-of-war and merchant steamers, we can hardly expect savages to respect the power of the nation or the rights of its citizens."<sup>113</sup>

Negotiations and even military action are influenced by the perceptions held on both sides of the table. As history attests, commitment, costs, benefits, and risks cannot be portrayed or determined by capability alone. Assessing motivations and principles quickly proves a humbling process, attributable to the elusiveness and scarcity of information, and the lack of meaningful feedback.<sup>114</sup>

Recognizing the existence of different cognitive maps, it is no wonder that perceptions of naval capability and of political and military will, can be misconstrued. Yet perception is the essence of presence, a central dynamic that is continually reassessed and reapplied. This perception influences options and actions for both friends and adversaries alike. An appreciation of this is crucial, as the

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<sup>112</sup> IBID, p.x.

<sup>113</sup> Hagan, p.55.

<sup>114</sup> Huth, Chapter one.

United States chooses to influence (coerce - deter and/or compel) beyond its geographic borders.

How much have times changed from the the 19th century, when the sending of a naval squadron represented a "ritual demonstration of commitment," and the size of the force served as an indicator of the nation's commitment?<sup>115</sup> A credible navy must still be perceived as fully combat capable, a force ready to become "actual" when and where deemed necessary. The force should be as logically independent of host nations as possible, and be capable of maintaining station abroad for indefinite periods. Also, the political will to use the force when necessary must be perceived.

The world is watching the dynamics of the United State's military drawdown. Funding for defense research and development is being deferred to meet present operational commitments, and the commitments themselves are increasingly having to be gapped because of unavailable forces. Another factor alluded to earlier, is the increasing fleet operational time away from homeport (OPTEMPO). This variable is obviously critical when assessing the fighting potential and morale of the force.

Port calls and multi-national exercises are indications of goodwill, friendship, and cooperation, but when national resolve or capability are perceived to be weak, then forward presence may encounter challenges. In the past, such perceptions have instilled overconfidence by aggressors, led to miscalculation by all

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<sup>115</sup>George and Smoke, p.16.

sides, and eventually inspired numerous actions, that at the time, were considered low-risk.

Corvettes offer a unique ability to exploit the mobility and initiative that sea borne forces offer. The flotilla offers a complementary addition to those forces forward deployed, positively influencing the emerging international environment. First, the mere presence of the ships signals commitment, and based on the number and configuration of the flotilla, the adversary receives clear and unambiguous signals of U. S. political and military resolve.

More times than not, in peace and hostilities, a flotilla of corvettes signals an appreciation of the needs and realities of the time, and demonstrates that the United States desires to remain engaged. It must be remembered that corvettes maintain a qualitative edge with their space-supported detect, track, and engagement capability, but their air defenses will be limited to point defense. Should an overwhelming air threat be present, than the forces require external air cover.

With the numbers of expensive combatants getting scarce, and the fact that there are no "quick" replacements, expensive warship liabilities can outweigh their unparalleled capabilities. The high cost of procurement can influence the nation's willingness to take risks, and present the operational commanders with a dilemma: establish sea control while preserving at all costs, the "irreplaceable handful

of capital ships.<sup>116</sup> Corvettes offer a solution by their "application of appropriate naval force at the decisive point, at the decisive moment."<sup>117</sup>

#### 4. Risks

Forward presence implies operating in littoral waters or "near land" areas of the world. These waters are often confined and congested, and pose several unique challenges due to their proximity to land. The risks are great for any warship, and may increasingly be so, especially for a navy designed to fight in open waters. The nation needs a ship designed to fight in restricted waters that reflects the American will to employ and risk it, if necessary.

Understanding that the international political climate often shifts suddenly, forward deploying naval forces entails an inherent level of risk. Corvettes, like any military option, present unique capabilities and limitations which must be understood. It is well to remember that there is no such thing as an invulnerable ship. The probability of a "mission kill" from a single hit can approach 100 %,<sup>118</sup> and neutralizing the high value or support ship, curtails the utility and reduces the survivability of the rest of the battle force.

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<sup>116</sup>Rosinski, H., The Development of Naval Thought, p.107 & 109, edited by B. M. Simpson III, Naval War College Press, 1977. Japanese staffs were faced with the same dilemma during the attacks on Port Arthur (1904-1905) and Pearl Harbor.

<sup>117</sup>Cable, J., Gunboat Diplomacy 1919-1979, Political Applications of Limited Naval Force, p.56-57, St. Martin's Press, 1981.

<sup>118</sup>Kehoe, J.W. Capt, USN (Ret), "Warship Design in the Future," p.149, George, James L. (editor), The U.S. Navy, The view from the Mid-1980's.

Strategy has always been an exercise in risk evaluation and reduction, with risk being defined as the difference between potential threats and a nation's capability to counter the threats.<sup>119</sup> This risk is a two edged sword, as each side attempts to raise the actual or perceptual level of intolerability. Such is the basis behind several regional military build-ups today, much as pre-World War I Germany's "risk theory", which was to build a fleet large enough that the British would dare not risk fighting the Royal Navy in war.<sup>120</sup>

Whether showing the flag during a portcall, or steaming off foreign shores, presence is potentially provocative, especially, during a crisis or conflict of interests. History demonstrates the recurring nature of misperception and miscalculation, amidst the "spiral of escalation." Although most action is intended before a crisis spreads, the process often quickly gets out of control. Uncertainty exists, both internal and external, as each party continually reassesses the other's resolve. Transition to a general war is always a distinct possibility, whether or not intended, especially when either side fears losing face. This brinkmanship, or the competition and manipulation of risk taking, carries the risk of disaster.<sup>121</sup> Even on those occasions when coercion succeeds, the success is often ephemeral, and "the

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<sup>119</sup>Drew, Dennis M. COL, & Snow Donald, Making Strategy: An Introduction to National Security Processes and Problems, p. xv, Air University Press, G.P.O., 1988.

<sup>120</sup>Murray, Williamson, "Naval Power in WW I," Seapower and Strategy, p.188.

<sup>121</sup>Shelling, p.114. Schelling takes the discussion beyond the scope of this paper, as he discusses the nuclear dimension.

consequences of continued frustration, are not easily predictable and are not necessarily benign."<sup>122</sup>

The use of corvette flotillas cannot be risk free; neither is the use of any naval warship. Risk, if improperly used "can bring national decline and a loss of temporal power and greatness."<sup>123</sup> To keep the level of risk commensurate with the objective, the political and military planners must understand what is the "preferred terminal situation."<sup>124</sup>

#### **D. MARITIME "NON-TRADITIONAL" SOURCES OF DISPUTES**

In the 1820s, the USNs most immediate and urgent tasking was the protection of American commerce. The scattered squadrons of small, fast vessels, patrolling and pirate chasing, became more useful than ships of the line or even frigates.<sup>125</sup>

Since the end of the Cold War, several non-traditional missions have risen in prominence, and present unique challenges for naval forces. The challenge is finding the proper balance between assets to support non-traditional contingencies (ie: high seas terrorism, freedom of navigation, pollution, fishing rights, piracy, etc), without sacrificing the capability to deter or succeed in a "traditional" warfighting campaign.

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<sup>122</sup>George & Smoke, p.5. may only be temporarily deterred, awaiting more opportune time, or could go after U.S. interests.

<sup>123</sup>Rosinski, p.x.

<sup>124</sup>Cable, p.178.

<sup>125</sup>Weigley, p.61.

Although the U. S. Navy is not specifically built with non-traditional missions in mind, their expanding popularity is increasingly impacting naval operations in terms of time, assets, and budget resources. This section explores what role these non-traditional missions might play in the twenty-first century, and what type of naval forces is required.

The ships which make up the present naval force structure were conceived, designed, appropriated, and deployed with open ocean conflict in mind. The problem, as Van Creveld points out, is that if militaries devote their resources towards conventional threats envisioned in previous wars, they may easily come up short in the future.<sup>126</sup> With numerous contingencies, the military planner must choose from among a myriad of tradeoffs, and obviously cannot prepare for everything. The challenge is that overemphasis in one area, if it proves to be the wrong area, could prove not only costly, but consequential.

### 1. Law of the sea (LOS)

For years Denmark collected dues on vessels passing through the sound, into the Baltic. Many nations objected, and during a conference in 1856, the major powers agreed to pay Denmark to discontinue the tax. The U.S. assessment was \$393,011<sup>127</sup>

Much has been written concerning the Third United Nations Convention on the Law of the Sea (UNCLOS III). This section points out that incidents stemming from "creeping jurisdiction" are expected to intensify in the twenty-first century as

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<sup>126</sup>Van Creveld, M., The Transformation of War, The Free Press, 1991.

<sup>127</sup>Thomas, p.140.

nations increasingly perceive the presence of foreign warships off their coast as an affront to their sovereignty. Future challenges to the old Roman principle that the seas are the commonwealth of mankind are a major non-traditional challenge affecting future naval policy.

a. **UNCLOS III**

UNCLOS III has been described as "the largest, most technically complex, continuous negotiation attempted in modern times." This is understandable given the diversity of interests of the developed against non-developed, coastal against land-locked, and resource-rich against resource-poor nations. A solution was finally reached only by grouping the key issues into packages.<sup>128</sup>

On November 16, 1993, Guyana became the 60th nation to ratify UNCLOS III, providing the required number of signatories to bring the convention into force.<sup>129</sup> The treaty, which the United States has adopted except for the provision concerning deep sea bed mining, is scheduled to become international law on November 16, 1994. Because of the charter's "package deal" character, several countries are contesting the right of the United States to selectively honor those aspects of the treaty considered beneficial, while refusing the sea bed issue. The

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<sup>128</sup>Friedheim, Negotiating the New Ocean Regime, pp. 5 and 73, University of South Carolina, 1993. This book does a superb job of displaying the movement of support among the various sub-groups. Chapter three describes the trade-offs, packages, and the side payments that were required to reach consensus. Major issues surrounded the development and distribution of near-shore and deep-ocean resources, and the preservation of ship transit rights.

<sup>129</sup>Broad, W.J., "Plan to Carve Up Ocean Floor Riches Nears Fruition," pp. B5 to B6, New York Times, March 29, 1993.

United States has countered in the past by insisting that unrestricted transit has always been a part of common law, therefore UNCLOS III granted no new rights. Although it remains unclear whether the United States will trade navigation rights for "nodules," the issue is expected to rise in eminence.

Measured by the amount of near-shore ocean real estate placed under national jurisdiction, the United States did very well by UNCLOS III. Not only did the United States acquire in excess of 3.9 billion acres in the EEZ,<sup>130</sup> but the Navy is able to roam the oceans, more than 12 miles from shore, and is able to transit through archipelagic and international straits.

This thesis does not go into the specific passage rights through the various bodies of water, as numerous sources are available on the subject. But several high points are mentioned as they pertain to the movement of naval vessels in the 21st century. With the changing geopolitical structure, many lesser developed countries (LDCs) are beginning to feel cheated by the cost and benefit of UNCLOS III. The traditional concept of freedom of navigation (FON) is increasingly coming under challenge. Several of these rights have been heavily contested by many African and Arab LDCs, notably the claim that freedom of navigation (FON) through their EEZs, or transit passage through their straits, implies approval for gunboat diplomacy.<sup>131</sup> So far these nations have been unable to mobilize support, as other LDCs realize that "superpower gunboats," can be useful, especially in regard to

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<sup>130</sup>Friedheim, p.308.

<sup>131</sup>Friedheim, p.93.

getting their goods to western markets. The exclusive economic zone (EEZ), which extends to 200 miles from the baseline, is receiving more emphasis, because these waters cover 36% of the world's oceans (see Figure 7).<sup>132</sup> Many nations are structuring their maritime forces to patrol the waters. But it is the "creeping jurisdiction" in archipelagic waters that is increasingly causing alarm, as UNCLOS III has changed the status and transit rights of vast tracts of water from international to internal waters.<sup>133</sup> For now the archipelagic states and the international community have created sea lanes for the major shipping routes, but foreign ships have lost the right to roam these now "internal" waters. "Transit passage," can not be taken for granted, especially when one considers that 135 international straits fall within a 12 mile territorial sea overlap.<sup>134</sup>

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<sup>132</sup>Chichester, M., "Multi National Naval Cooperation in a Changing World," Navy International, p.54, March 1992, Vol 97, no.3.

<sup>133</sup> Philippines, Indonesia (1400 islands), Fiji, and Mauritius are a few nations with archipelagic baselines.

<sup>134</sup> Greene, J.K. , "Freedom of Navigation: New strategy for the Navy's FON Program", p.8, Naval War College, 13 February, 1992.

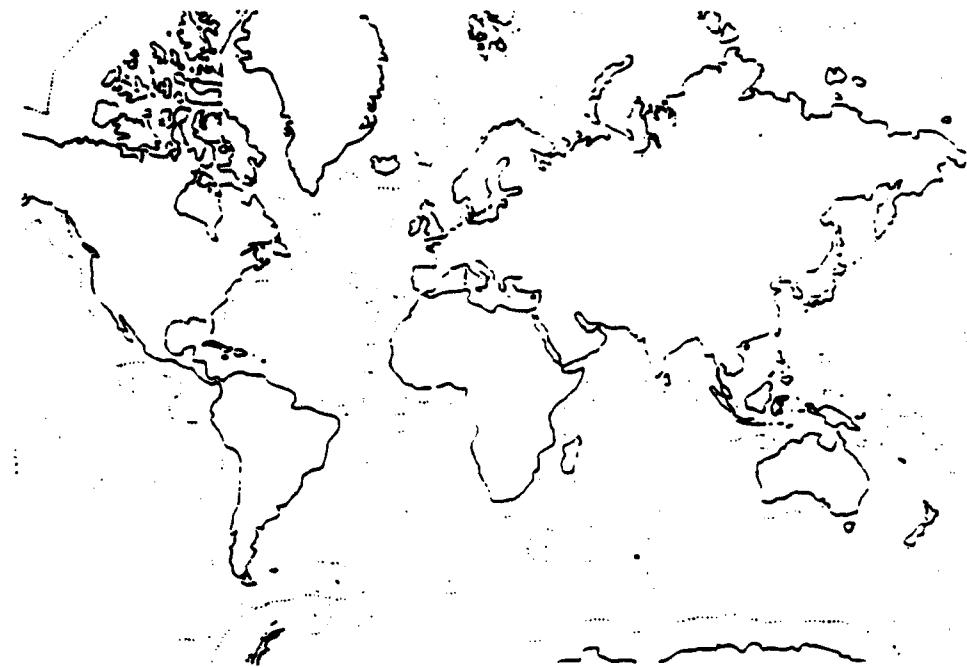


FIGURE 7: The 200 mile EEZ.

Source: K. Booth, Law Force and Diplomacy at Sea, George Allen and Unwin, 1985.

**b. Freedom of navigation (FON)**

The U.S. Navy's Freedom of Navigation (FON) program exercises and asserts American navigation and overflight rights throughout the world, and carries an inherent amount of risk. Some claims, for example the 200 mile territorial sea claim by El Salvador, Nicaragua, and Panama connote less risk than others, for example Libya's claim in the Gulf of Sidra (military action in 1981 and 1986). Challenging the sovereign claims of another falls on the edge of provoking response, and requires care to control any risk of escalation.

The timely deployment and support of U. S. military forces abroad require unencumbered freedom of navigation. If the United States desires to maintain a role in world leadership, than it must be prepared to underwrite freedom of navigation rights. But a billion dollar Aegis warship is not always the best ship to

enforce the right. Gone are the days when a warship can demonstrate its "peaceful intent" by 'letting fly its topsail', training its guns fore and aft, with their breeches covered.<sup>135</sup> Any corvettes performing FON must be alert.

## 2. Multinational cooperation

protecting American interests (in China), to the extent permitted was often inadequate given the resources devoted, and the vast distances between ports and expanses of ocean. As such, American warships often cooperated in a unified front, with European counterparts, for the protection of western lives and property.<sup>136</sup>

With the Cold War over, asymmetries among allies are becoming more evident as the key security concern which brought the alliances together diminishes. Such is the dilemma of not just who to ally with, but also what should the alliance be about. Should it be permanent or ad-hoc, and what are the advantages and costs of each? The United States must remain selective and discriminating in its commitment to alliances, and no commitment is ever absolute.

The United States cannot be sure who its coalition partners will be next year, much less next century. This makes the building of effective military forces, capable of operating together, tough. U.S. Naval ships are incompatible with the majority of the world's navies whose maritime interests and forces are designed for the contiguous zones (CZs). Even in the best of circumstances, multinational naval operations are difficult, often plagued by incompatibilities. But multinational

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<sup>135</sup>Till, G., Modern Sea Power, p. 20, vol. 1, Royal Naval College, Brassey's Defense Publishers, 1987.

<sup>136</sup>Hagan, p. 189.

operations are expected to increase in light of the downsizing of American military forces at home and abroad.

With the exception of NATO, U.S. warships are not specifically designed to operate with allies. The corvette offers compatibility without sacrificing capability, providing numerous indirect benefits.

### 3. Piracy / Mass migration / Drug traffic / Peacekeeping (PK)

Maritime piracy has been around since ships and their cargoes traversed the high seas. It still exists, with attacks increasing off the coasts of West Africa, Brazil, Columbia, Ecuador, the Hong Kong - Hainan - Luzon Triangle, and the Singapore and Malacca Straits. This activity is particularly risky in the latter area, for with little room to maneuver, a ship under attack may ground or collide with another, thereby causing enormous ecological and economic damage.<sup>137</sup> Since most littoral states lack the capability to alleviate the problem, this is one area which may require increased multi-national cooperation, to which corvettes could contribute.

In 1893 President Cleveland rejected requests from Americans living in Hawaii for annexation. This lack of interest disappeared in 1897, when President McKinley received news that two Japanese warships had entered Hawaiian waters, in protest of US immigration laws. By 1897 the Japanese population on Hawaii was a majority, with over 25,000 people, accounting for over 1/4 of the Hawaiian population.<sup>138</sup>

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<sup>137</sup>Scott, David L. LCDR, USCG, "Piracy, Terrorism, and Crime at Sea," p.1, colloquium on Maritime Security and Conflict Resolution, Centre for Foreign Policy Studies, Dalhousie University, Halifax Nova Scotia, Canada, June 1993. The Straits of Malacca (500 miles long) typically has 5000-6000 ships a month transit its narrow waterway. Many of these ships are ultra large oil tankers that exceed 250,000 tons.

<sup>138</sup>LaFeber, p.191. the Japanese population outnumbered the Americans, Europeans, and even the Hawaiians themselves.

Malthusian predictions are being made again, as a new cycle of overpopulation and undernourishment is being experienced in several of the world's poorest countries. Current growth rates are expected to double every 25 years in parts of the world least able to afford them, taxing the entire international system. This problem portends massive humanitarian, refugee, and migration consequences for America.

In the Western hemisphere, Haitian and Cuban migration problems persist, (48,000 Haitians legally entered the U.S. last year) and imagine if political problems languish in for example the PRC. Escaping the human suffering in their country and/or striving for the promises of a better life, many more illegal migrations are expected next century. Many of these people will travel by sea, insinuating that maritime patrols could be called upon more should this be a national interest.

Military assets have been employed in the war against drugs for a number of years now. Operationally, the mission entails intercepting and boarding a suspected vessel. Clearly, if the mission is deemed to be of national interest, corvettes could perform the inspection, with much greater cost effectiveness, than many of the ships presently employed.

Navy Secretary James Forrestal asserted "that among post WW-II strategies, U.S. naval policy would adopt and support the UN, through a new naval mission called peacekeeping."<sup>139</sup>

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<sup>139</sup>Ryan, p.7.

Only a handful of UN naval operations have taken place, and aside from the transporting of goods and/or personnel, and the provision of humanitarian assistance, naval contributions today can be counted in the following six of 29 peacekeeping (PK) missions (20%) around the world:

UN Transition Assistance Authority in Cambodia (UNTAC)  
UN Protection Force Former Yugoslavia (UNPROFOR)  
UN Iraq-Kuwait Observer Mission (UNIKOM)  
UN Operation Mission in Somalia (UNOSOM)  
UN OBSERVER GROUP FOR VERIFICATION OF ELECTIONS HAITI  
(ONUVEH)  
SOLOMON ISLANDS OBSERVER FORCE

A casual glance suggests that the Navy's role is minor; proportionately it is indeed. But UNPROFOR forces in the Adriatic, UNOSOM units off Somalia, and ONUVEH ships embagoing Haiti continue to require significant numbers of warships. The operations are relatively low risk, but cannot be considered risk-free. But perhaps the greatest risk, and one which the Navy is going to have to become accustomed, is that of not having enough ships to meet all of the Nation's commitments.<sup>140</sup>

American naval ships are not designed to conduct traditional UN missions. One might claim that the point is moot, considering the non-maritime nature of most of the operations (monitoring human rights, promoting democratic elections, or supervising ceasefires), but consider the motivation behind (ONUVEH).

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<sup>140</sup>Beyond the mere reduction of ARG/CVBG escorts, various cost savings measures, some impacting on readiness have been necessary to finance the mission in Somalia and the Adriatic. Examples include the delay of numerous ship and aircraft overhauls, and the curtailing of 4th quarter Pacific fleet operations, exercises, and port visits.

Who would have guessed that six naval vessels would be called to help restore democracy. Naval officers do not dictate policy, but if the interest is so deemed, then corvettes make ideal platforms for some of the missions.

It is crucial to ensure that vessels engaged in peacekeeping (PK) are adequately prepared. Areas that warrant attention and interoperability include: C4I, doctrine, rules of engagement (ROE), training and joint exercises, intelligence sharing, identifying friend or foe measures (IFF), and logistic support. If PK is deemed in the national interest, corvette design can be tailored to support UN operations.

## VI. CONCLUSION

Forward deployed naval forces are expected to remain the principal military option for underscoring U.S. foreign policy objectives abroad. This expectation is based not only on the continuing drawdown of "permanently" based American forces abroad, but also in recognition of the unique and attractive nature of naval forces, including: flexibility, responsiveness, durability, and recallability. But as the numbers of deployable ships decline, keeping the forward deployment of adequate numbers of U.S. Navy forces will become increasingly difficult. So-called "adaptive force packages" are an attempt to solve part of the problem, yet some theater coverage is increasingly being "gapped."

Lacking unlimited resources, determining the correct number, capability, and mix of warships is extremely difficult, if not impossible. Part of the dilemma centers around the question of quality vs. quantity, most notably how to build, maintain, and operate extremely capable and expensive ships, adequate in number to persevere during conflict, while also having enough ships to accomplish a myriad of peacetime commitments.

As large numbers of expensive combatants become less affordable and, in a sense perhaps, "irreplaceable," their liabilities can outweigh their unparalleled capabilities. The high cost of procurement and low numbers on scene can influence the nation's willingness to take risks, and thereby present the operational commanders with a dilemma: how to fight inshore along the littorals without jeopardizing the "irreplaceable handful of capital ships. Small, 1,500 ton corvettes

can offer a solution by way of their ability to apply "appropriate naval force at the decisive point, at the decisive moment."

Although small combatants are not part of present American naval strategy, this thesis concludes that small corvettes can carry out several of the wartime roles and forward presence missions of the future. This conclusion is based on three interrelated factors: national strategy, fiscal constraints, and emerging or anticipated technologies. The penalty of building only capital warships is too few for success in war or availability in peace. A corvette flotilla, as postulated in the thesis, presents a complementary and necessary balance to the combatant fleet of 2010.

American corvette-size ships can contribute to or augment the American commitment abroad, when the military potential and the character of the force obviously influences and, at times, dictates mission success. TABLE 9 is a synopsis of several salient points which must be considered as one attempts to find a balance between requirements, capability, and affordability.

TABLE 9: (CORVETTE PROS AND CONS)

<u>BENEFITS</u>	<u>LIABILITIES</u>
Affordable, more assets on station, and less manning per corvette	Too vulnerable (mothership, C3I link, the corvettes themselves)
Exploits emerging or anticipated technologies, with affordable inshore combat power	Not multi-mission capable
#s of ships most important warship attribute	Limited firepower
Flexible fire power distribution	Limited staying power
Less costly to build in time, money, and personnel	
Allied interoperability with minimal ties to host nation	Limited deterrent
Export potential	

The thesis found that the acquisition cost of an eight corvette flotilla, including a mothership, is about the same as three DDG-51s. The flotilla of eight deployed will maintain four or five corvettes at sea and on station. Of the three DDGs, only one at a time would be forward deployed, while the other two are in various stages of training, transit, or maintenance. Compared with a DDG, a corvette has shorter time on station, less staying power, the need for a mothership, and other limitations which are offset by having at least four capable ships, at any one time, in as many different locations. The flotilla's replacement "Blue / Gold" crew takes over at the end of six months, providing greater ship utilization, and mitigating the problem of a decreasing pool of ships and long transit times to AORs.

Two areas require further investigation in comparing costs. The first relates to the higher overall personnel manning requirement to maintain a flotilla forward deployed, and the second involves looking at the cost of maintaining the flotilla forward deployed. Both of these considerations must be weighed against the benefits of maintaining eight vice just one ship forward deployed.

There is no doubt that, given the current fiscal environment, any decision to build corvette flotillas would be made at the cost of some assets presently planned and funded (for example: three DDG-51s per year). This thesis suggests that a better plan would be to fund 6 DDGs and one flotilla over a three year period. Another point to consider is that the estimated \$200 million per corvette could be reduced by using the prototype as a replacement for the aging Coast Guard cutter fleet. Additionally, a less capable version could also be competitive in the export market. Corvettes are the ship of choice for a majority of the world's navies.

Small combatants may serve several missions well, but the question which must be answered, is how they will perform in a high threat environment. Forward presence implies the need to operate in littoral waters, which poses several unique challenges due to the proximity to land. Threats to any ship operating close to a hostile shore will potentially be intense, involving a coordinated, multidirectional, and multidimensional attack.

Although small surface craft have not fared well since 1980, losses were typically the result of inadequate state of the art point defense weapons, sensors, or decoys. By incorporating offship sensor nets (SEW and UAVs), sophisticated tactical

data systems (TDS), and enhanced weapon suites, the future corvette can overcome most of these shortcomings. Additionally, the value of the concept in this area is best measured by the synergistic tactical effectiveness of the flotilla.

Two critical nodes must be protected if the flotilla is to function. The first concerns the mothership which furnishes almost all of the corvette's sustainment needs. Although this ship requires a high degree of self protection and staying power, it will usually remain outside the area(s) of contention. The attractiveness of the mothership concept is reduced reliance on host nations and/or other fleet assets, and the opportunity it creates to commit a high percentage of the corvette tonnage to warfighting tasks. Nonetheless, the loss of a mothership could entail the "catastrophic degradation" of the flotilla's combat capabilities as a whole. It must be designed with high staying power and operationally kept out of "harm's way."

The second node concerns the disruption of the external D/T/E sensor net (UAVs or SEW assets) or the connectivity with the associated data link. Since this is the primary means to track and engage targets, these "ears and eyes" are critical for mission success. An effective sensor net is absolutely critical, because with minimal armor and redundancy, corvettes will usually not survive a direct missile hit. But then neither will larger combatants, as evidenced during the Falklands Conflict.

Technological innovation has overcome much of the straight-line relationship between size, capability, and cost. For a relatively low acquisition cost, corvettes are expected to perform a wide assortment of duties, to include: (1) provide local ASW and ASUW for an approaching force from the sea; (2) escort high value targets

(HVTs) near the terminal points of ingress and egress, on oceanic transit, and choke point operations; (3) support limited TLAM strike operations; (4) provide a landing and takeoff platform for various small to medium size joint air assets; (5) perform maritime embargo, blockade, quarantine, and interdiction; (6) participate in multi-national maritime initiatives; and (7), contribute to a host of non-traditional missions.

Several of the capabilities required to reliably perform these missions do not presently exist on a ship in the 1,500 ton range. Most, if not all, of the these shortfalls are probably correctable by 2010, given the necessary policy direction. Major shortfalls of the current generation of 1,500 ton corvettes include: (1) most small ships in this range are rarely intended to operate far from the shore for extended periods of time; (2) the addition of four box-launched TLAMs impacts not only ship size, stability, and RCS, but increases the vulnerability to the ship should one of the missiles take a hit; (3) a medium vice small helo launch and recovery capability is essential; (4) the corvette will rely solely on a VDS for ASW; (5) the primary detect / track / engage capability for the flotilla will rely on off ship sources (organic UAVs and SEW assets); and (6), the postulated crew size is one-half to one-third that of crew complements on similarly sized ships today. Although informal advice has been sought from a variety of ship design sources, it remains necessary to determine if the capabilities are overly optimistic, and if so by how much. A 15 to 20 percent difference between desired and technically feasible is considered acceptable, whereas a 50 percent difference would require rethinking applicable portions of the thesis.

Two technologies which are deemed critical for this concept of forward deployed flotillas to work are stealth and ASM defense. The flotilla as envisioned, places a premium on stealth characteristics. The application of stealth is multidimensional, as several spectrums must be masked, including noise, infrared (IR) signature, radar cross section (RCS), and wake. As success is met in one area, potential opponents are likely to concentrate on exploiting weaknesses elsewhere.

The second critical technology concerns the means of defending the ship against a coordinated and preemptive attack by low flying and low observable cruise missiles. Two technologies which offer much promise are DSP weapon cueing with EW assets and ongoing work involving high altitude, high endurance UAVs (ie: DARO). These air umbrellas increase the radar horizon range and increase the reaction time available. Without this capability, tested and reliable, the flotilla concept is deemed unfeasible.

Just as attractive as the "per unit cost," the numbers of ships is also an important warship attribute. Throughout naval history, nations have repeatedly rediscovered the need for small ships to perform a variety of tasks for which larger ships proved ill-suited. The primary advantage of the corvette flotilla scheme is in the numbers of the corvettes. These numbers are critical for several aspects of the presence mission, as the CINC must ensure not only the availability of escorts to protect the CVBGs, ARGs, and the large vulnerable sealift, but in time require ample forces that can close within range to affect operations ashore.

It is necessary to point out that that the proposed corvette "solution" is not to be confused with Admiral Zumwalt's Hi/Lo concept. This postulated corvette is intended to steam in front, leading the fight in littoral waters. The "lo" is not set too low, and dispersion of the flotilla spreads the risk to the corvette force, a factor which could be invaluable in a coastal scenario where the probability of loss to surprise attack is high, even for a "high-mix" DDG. Should the national interest deem it necessary, the flotilla could lower the overall cost in dollars and lives.

When comparing warship attributes in today's uncertain environment, the attribute which is consistently the most advantageous in force-on-force engagements is the number of combat units, with the combat advantage of numbers applying under a wide set of circumstances. This and the "expanding cumulative advantage," demonstrates why the commander is better off with twice as many units of force than with units of twice the rate of offensive and defensive firepower.

Because of the military potential of an eight ship flotilla, an adversary can ill afford to neglect any ship as each unit has the firepower to engage four of the enemy. Because of better C3I, corvettes provide the capability to inflict damage more than their apparent weight would suggest. Just as ship of the line tactics in the past called upon concentrated firepower by steaming in tight columnar formations, the flotilla's effectiveness depends on the synergistic and cooperative engagement from the whole force.

Numbers are great, but what about the corvette's limited firepower, endurance, and staying power? Operating forward on a long tether places

tremendous stress on both the ship and the crew. Ship endurance is measured not only by gallons of fuel per mile, but more importantly by crew limitations (stores and especially rest) and maintenance requirements (spare parts and repair time). After considering all of these factors, the thesis finds it feasible for an eight ship flotilla to maintain at least four to five ships on station, around the clock, at distances extending up to 200 miles from the mother ship.

Two warfare areas in which the corvette's contribution is negligible are air superiority and naval gunfire support (NGFS). Should a formidable air threat be present, the flotilla would require external anti-air assets to augment the force. Would corvettes prompt an adversary to build up air forces to overcome this relative weakness? The answer is not clear. Nevertheless, corvettes possess soft and hard kill anti-air systems, designed for adequate point defense.

The second shortcoming concerns the 76 mm gun, which is less than optimal for NGFS. Experiments are being conducted with vertical-launched fire support missiles (ie: 160 mile ATACMS), which could prove an option worth considering. Other than onboard ordnance, the corvette can shuttle various air assault packages, UAVs, and SH-60s with a variety of cannons, missiles, and various countermeasure payloads.

The corvette flotilla may not carry a large number of weapons in the magazines, but given the advantages offered by better C4I, the corvettes are expected to maximize the effect offered by their wide assortment of weapons. Replenishing

the armament for the force after an engagement is a factor not explored, but acknowledged.

American interests are so intertwined and interdependent with other nations, that engagement with the rest of the world, and world politics will remain essential. Despite the glitches that multinational operations have encountered recently in Somalia and the Balkans, they are expected to increase in light of the downsizing of American military forces. On a maritime dimension, corvettes offer compatibility with foreign navies without sacrificing capability.

Corvettes are ideal platforms to compel or deter, recognizing the inherent limitations of deterrence and compellence. It is concluded that since a flotilla of corvettes usually will not tilt the local balance of forces, they are not suitable for immediate-extended deterrence. Of course this depends on the quality of the aggressor relative to the protege. Overall, the flotilla can contribute to general deterrence.

Forward deployed flotillas eliminate transit times which equates to quicker response. Because of the flotilla's "advantage in numbers," the adversary's decision making process is greatly complicated, since he no longer can concentrate on just a few platforms. Each corvette impacts the campaign in some way, raising the cost and risk for the adversary. Corvettes can be sent in and fight where the risk is high.

Port calls and multi-national exercises are indicators of goodwill, friendship, and cooperation, but when national resolve or capability are perceived to be weak, then forward deployed forces may encounter challenges. In the past, such

perceptions have instilled overconfidence in aggressors, led to miscalculation by all sides, and eventually inspired numerous actions, that at the time, were considered low-risk. In this light, the flotilla is viewed as a fighting force that signals an appreciation of the needs and realities of the time, and demonstrates that the United States desires to remain globally engaged. It must be remembered that corvettes maintain a qualitative edge with their SEW and UAV supported detect, track, and engagement capability, but their air defenses are intended solely for point defense. The flotilla can be a force multiplier, augmenting the CINCs concentration of forces in both time and space.

This thesis touched on the nature of forward military naval operations, as the Nation must ask how far forward, and determine whether presence actually stabilizes or escalates a crisis or arms build-up. Corvette flotillas can not do everything expected of forward deployed naval units, but they do provide a necessary balance between requirements, capability, and affordability. Each of these goals are important to the Nation as a whole, and can be accomplished without sacrificing American military tactical advantage or strategic commitment as a world leader.

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